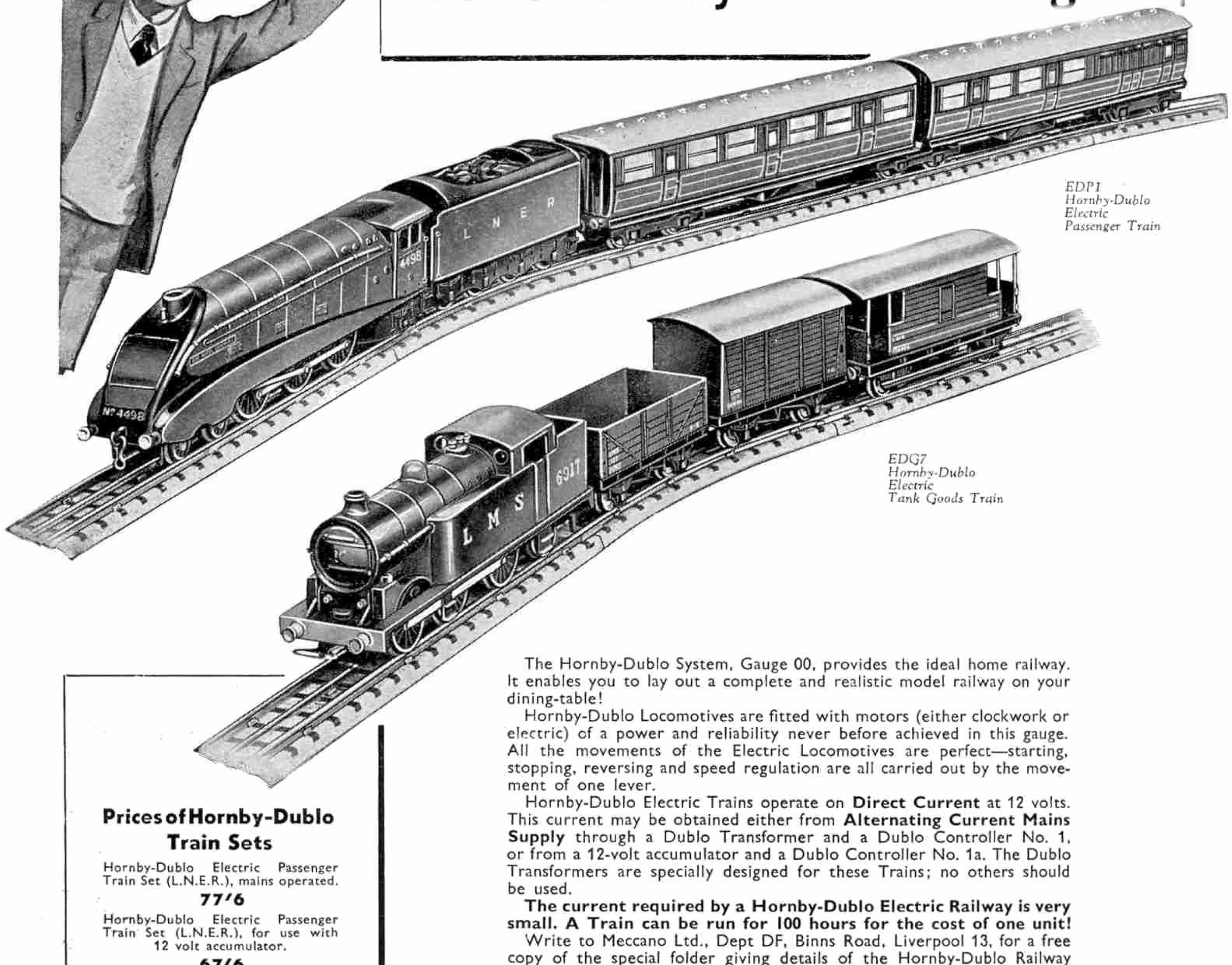
VOL. XXV. Nº 10. OCTOBER 1940

MECCANO MAGAZINE

FILLING UP!

6D.

Have **YOU** seen this ideal home railway in "00" Gauge?



EDP1
Hornby-Dublo
Electric
Passenger Train

EDG7
Hornby-Dublo
Electric
Tank Goods Train

Prices of Hornby-Dublo Train Sets

Hornby-Dublo Electric Passenger Train Set (L.N.E.R.), mains operated.

77/6

Hornby-Dublo Electric Passenger Train Set (L.N.E.R.), for use with 12 volt accumulator.

67/6

Hornby-Dublo Clockwork Passenger Train Set (L.N.E.R.).

43/6

Hornby-Dublo Electric Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.), mains operated.

62/6

Hornby-Dublo Electric Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.), for use with 12 volt accumulator.

52/6

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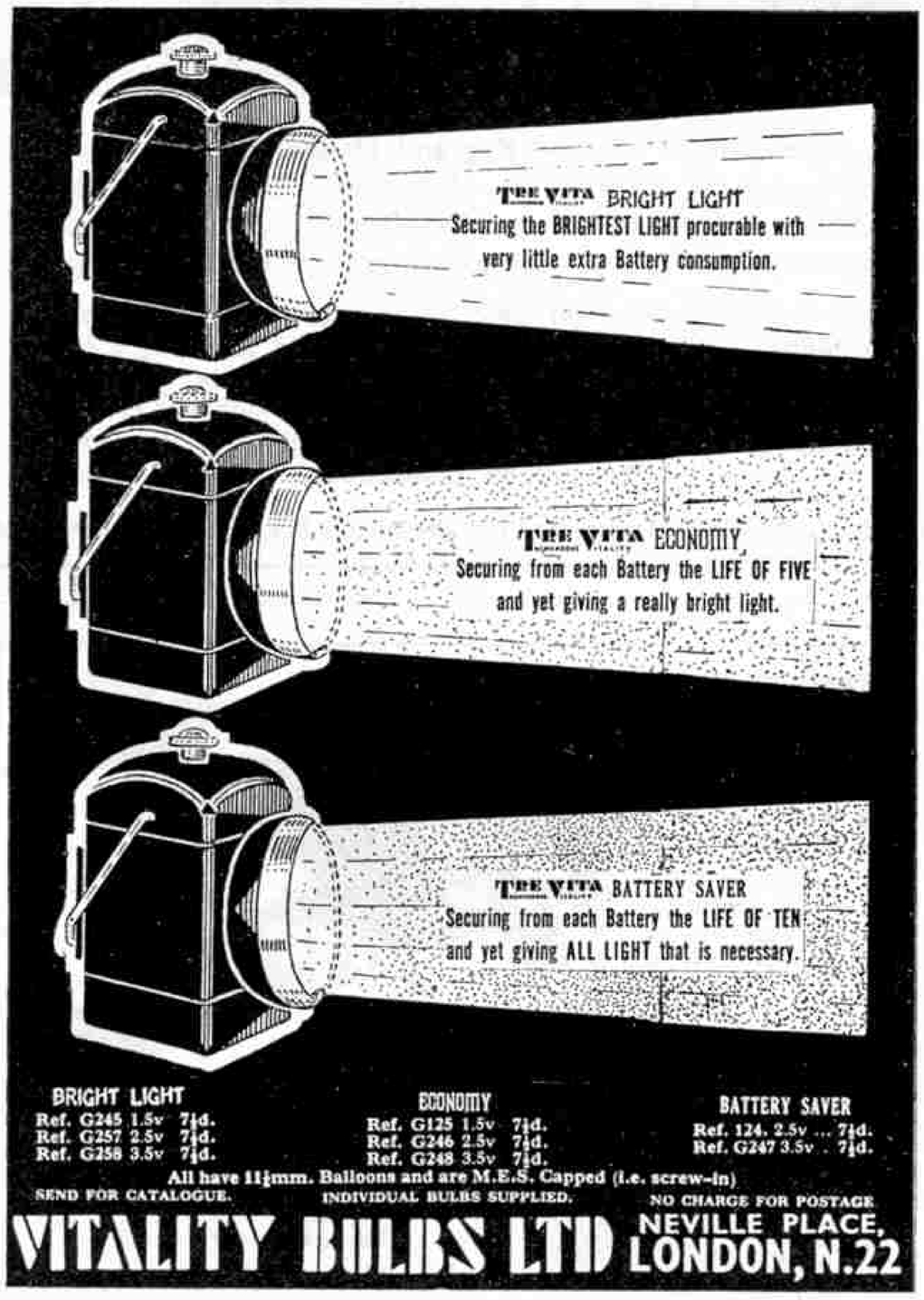
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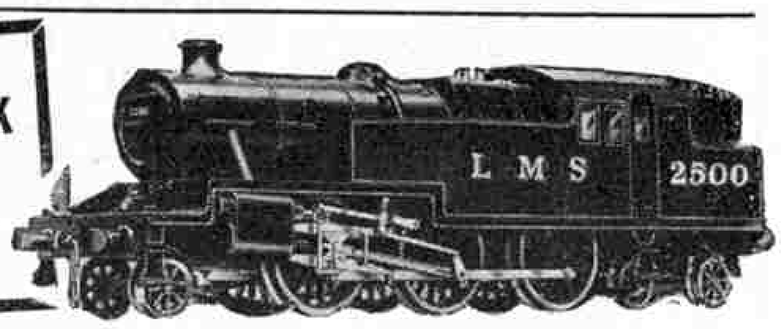

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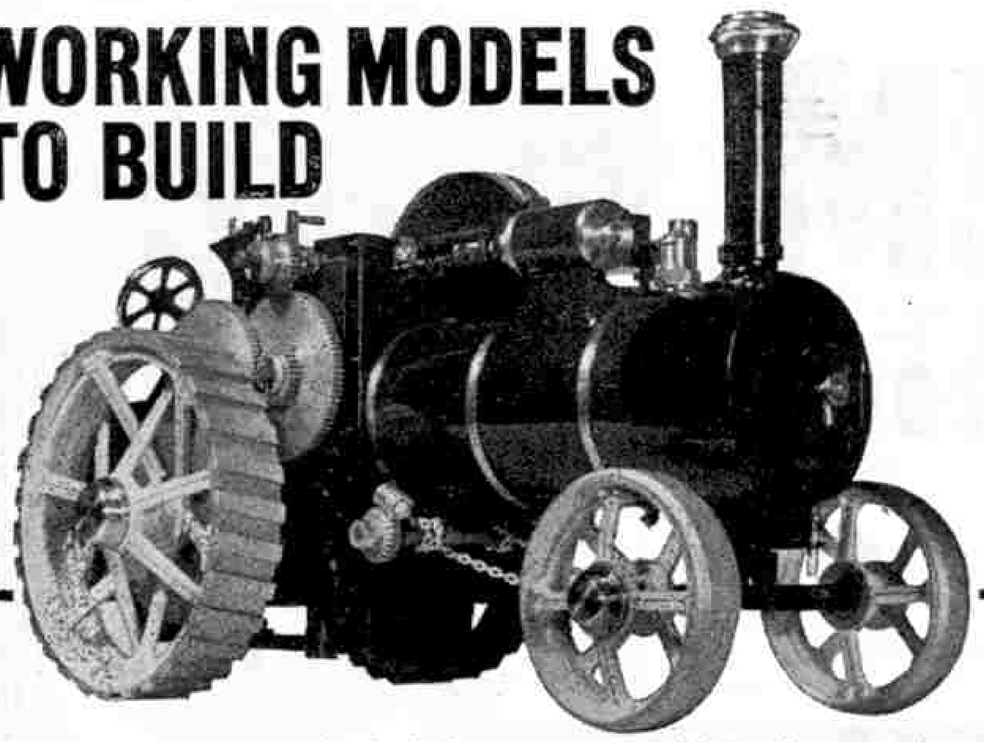

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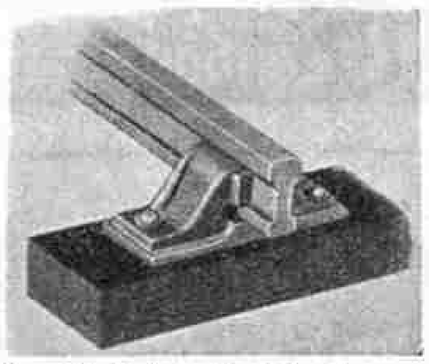

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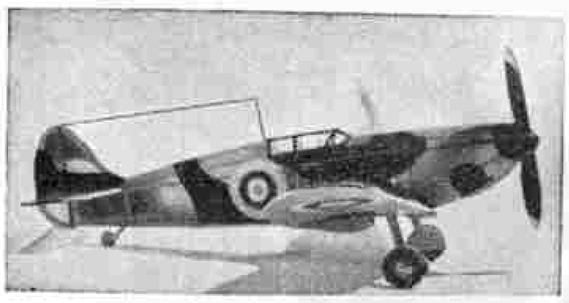

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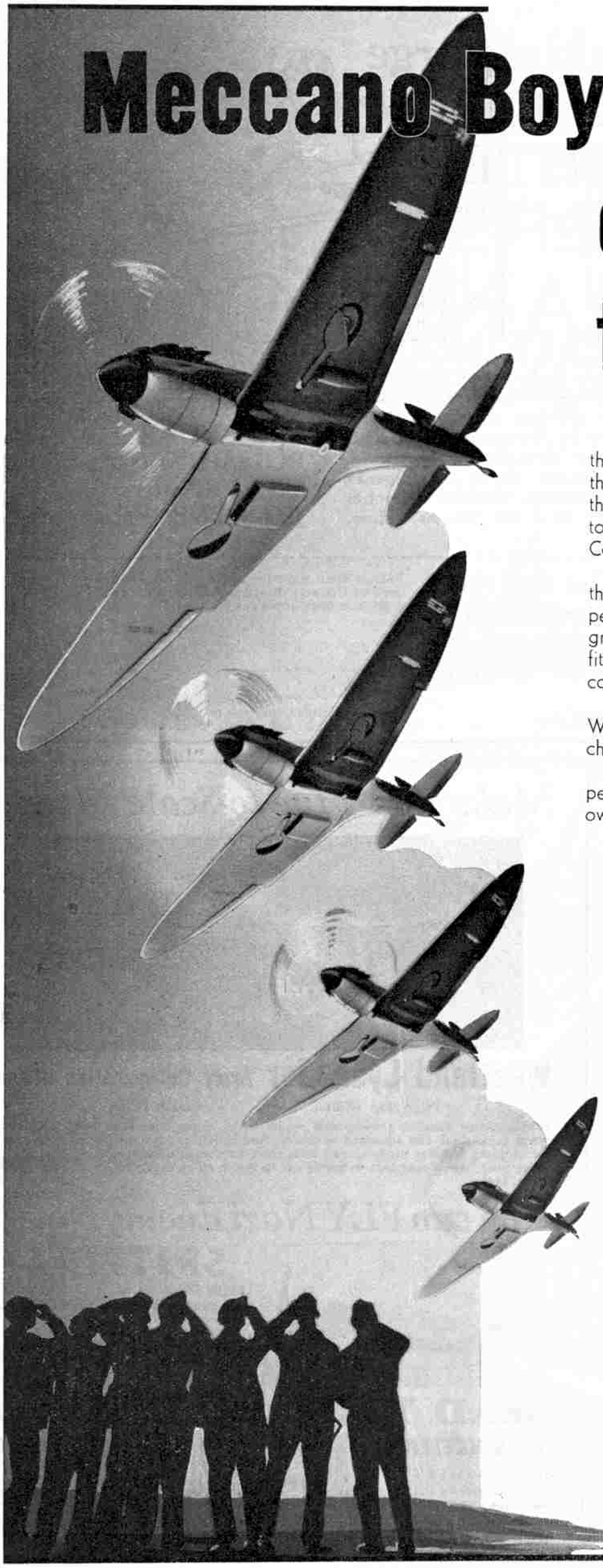


Meccano Boys to give their own "Spitfire" to the R.A.F!

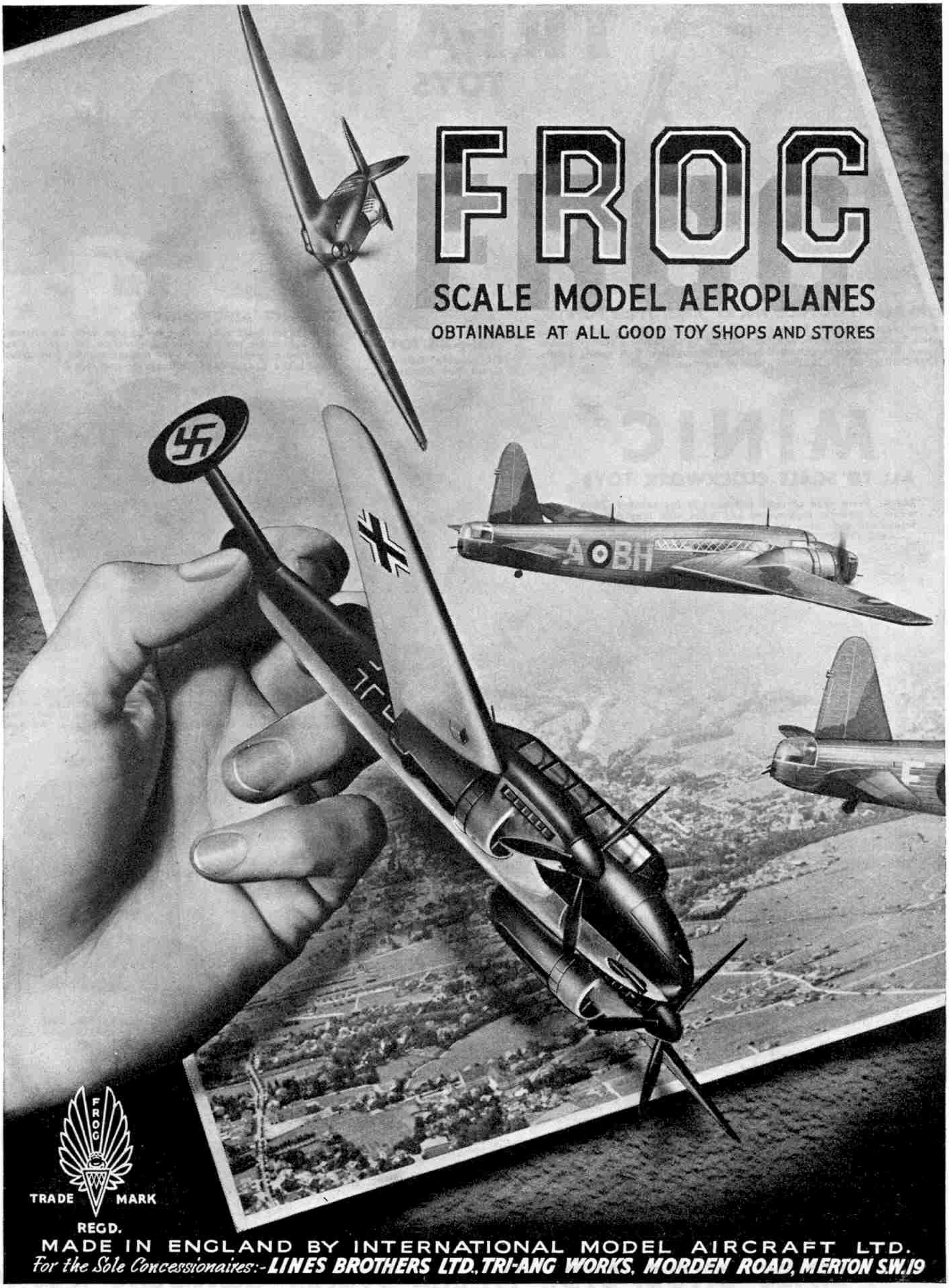
Meccano boys from all parts of the Empire have written during the past few months to express the wish that it might be possible for them to combine in some way to buy a "Spitfire," to be known as the "Meccano Spitfire," for the R.A.F. In this way they would be able to express their appreciation of the glorious work of the Fighter Command.

To help to carry out this scheme our Directors have arranged for the production of a special miniature "Spitfire" in the form of a pendant. This pendant is available beautifully enamelled in bright green with red propeller, or bright red with green propeller; and is fitted with a split ring so that it can be worn on the lapel of a coat or costume.

The pendant will be sold at 2/6d, and every penny of this, WITHOUT DEDUCTION OF ANY KIND, will go to a Fund to purchase a "Spitfire."

Mothers and sisters of all Meccano boys should have a "Spitfire" pendant. Boys! See that they have one, and so help towards your own "Meccano Spitfire."

Samples of the "Spitfire" pendant have been sent to all Meccano dealers. Visit your dealer at once, and see for yourself this fascinating miniature.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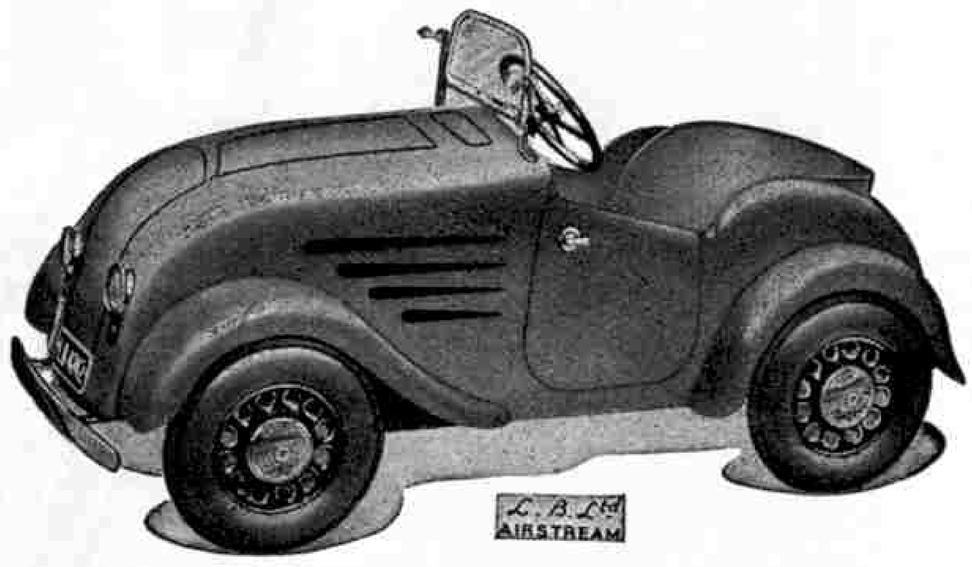
Obtainable from all Good Toy Shops and Stores



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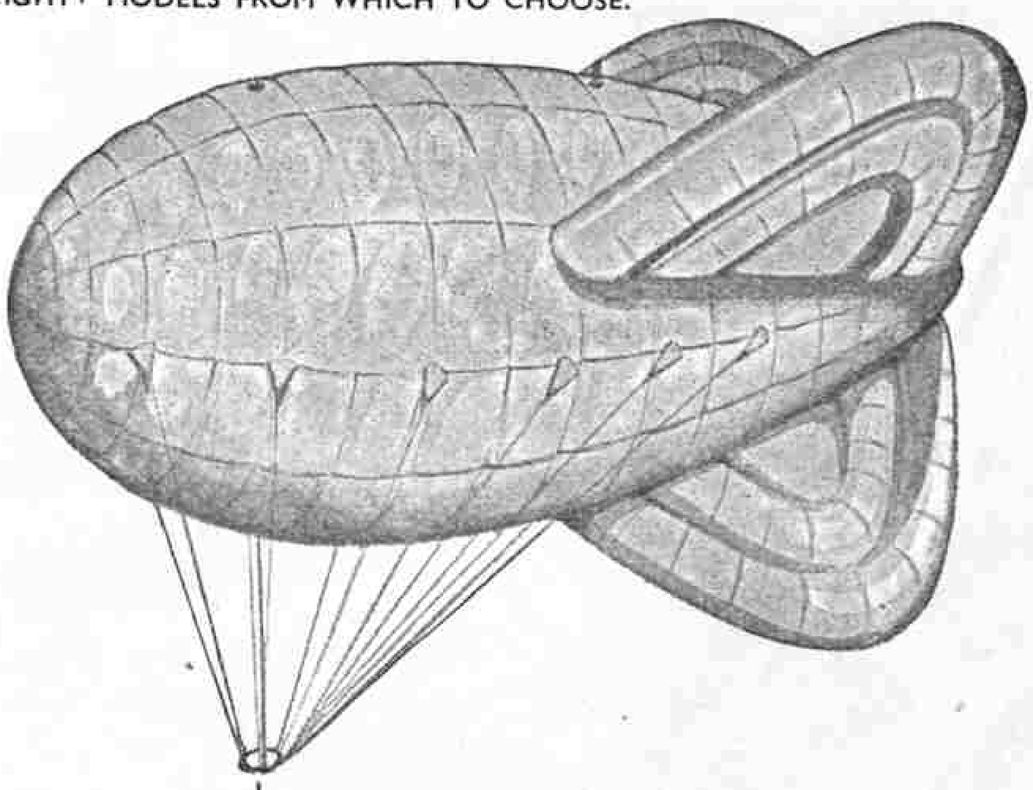
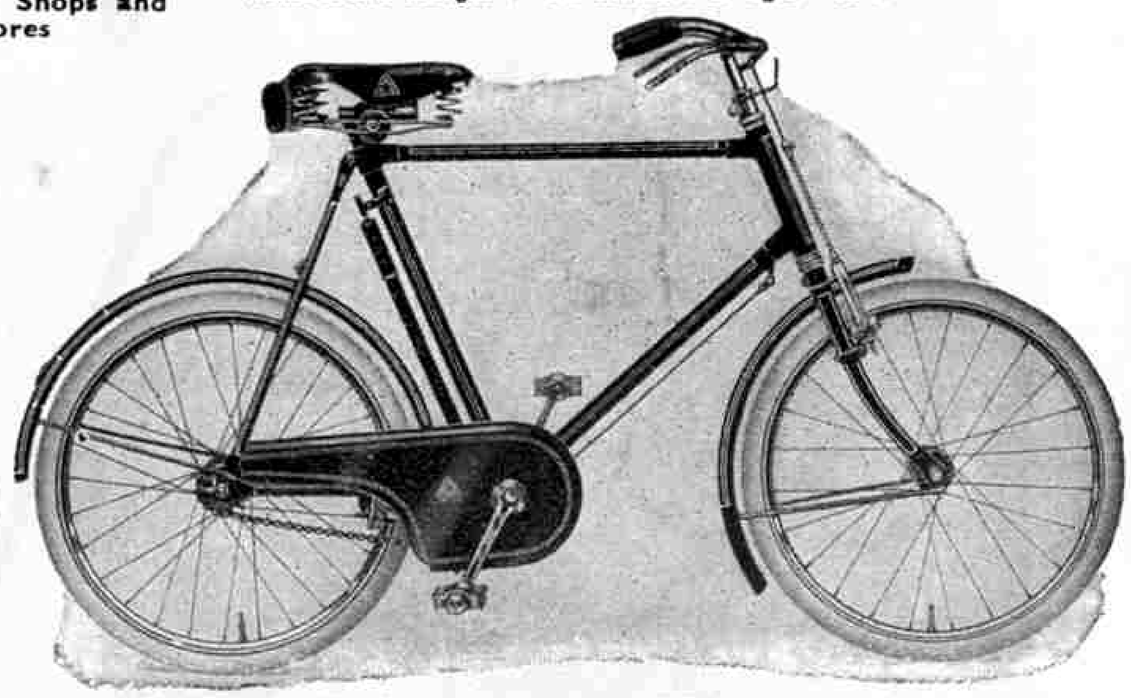


MINIC BALLOON BARRAGE

Made up Clockwork Winch Lorry with Gas Cylinder Trailer and Construction Kit for Balloon

LENGTH of Winch Lorry and Trailer 9 ins.
LENGTH of Barrage Balloon 13½ ins.
LENGTH of Cable 18 ft.

MINIC Scale Model Balloon Barrage



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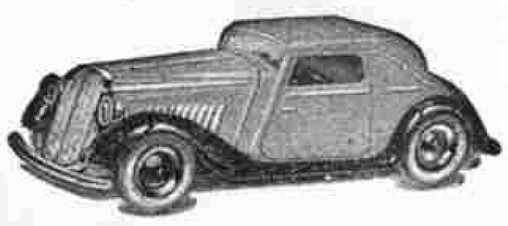
16 in. frame. Finest quality British tube. Wheels 16 in. x 1⅜ in. CHROMIUM-PLATED rims. Dunlop pneumatic tyres. Roller lever pattern brakes. Three-coil saddle. ½ in. x ⅛ in. roller chain. Ball-bearings throughout. Complete with equipment and finished in black, blue or maroon. All usual bright parts CHROMIUM-PLATED. Ages 7 to 11.

MINIC Tank. Length 3½ ins. Also obtainable in Camouflage Colours.

MINIC Traffic Control Car LENGTH 7 ins.

MINIC Timber Lorry. Length 5½ ins.



MINIC Vauxhall Cabriolet. Also obtainable in camouflage colours. LENGTH 5 ins.

MINIC Six Wheel Army Lorry. Also obtainable in camouflage colours. LENGTH 5½ ins.

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Next Month: "GERMAN AIR RAIDS AND RAIDERS." Publishing Date: 1st November

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXV. No. 10
October 1940

With the Editor

A "Meccano Spitfire" for the Royal Air Force

The glorious exploits of the Royal Air Force during the past few months have aroused increasing enthusiasm among Meccano boys everywhere, and a strong desire has been expressed that this feeling should be shown practically in the form of a "Meccano Spitfire" to be presented to the R.A.F. This would be a contribution to the war effort that Meccano boys throughout the world would be glad to make.

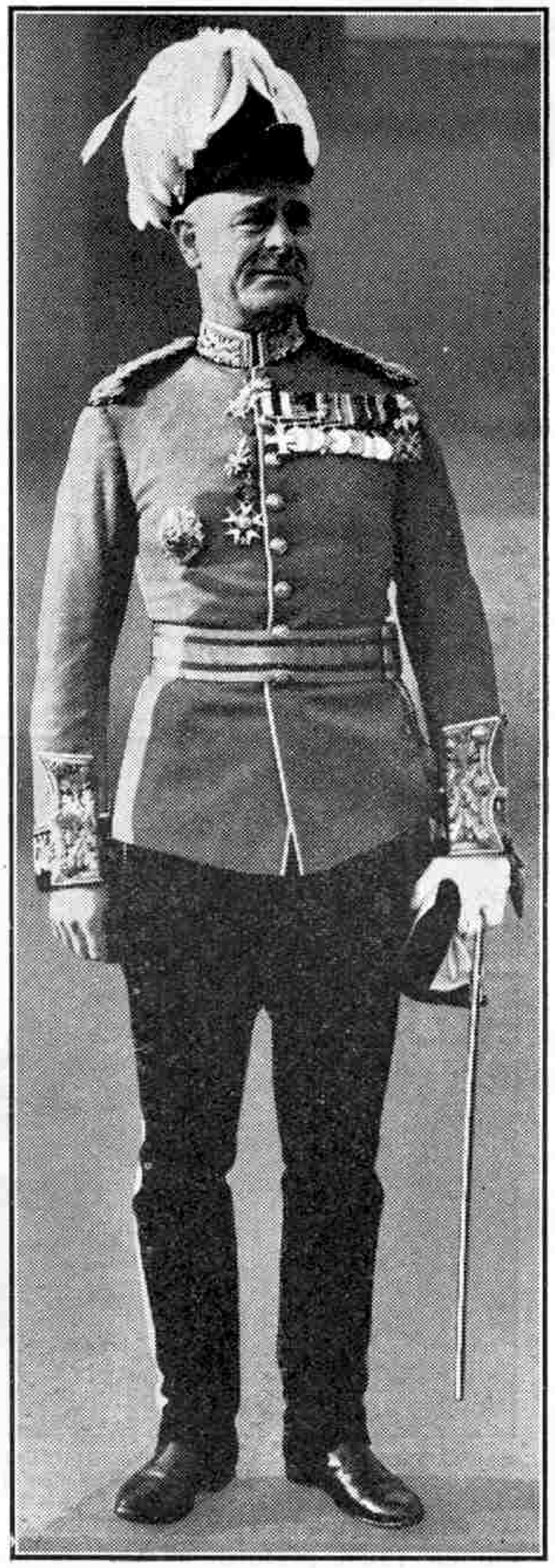
To help to carry out this scheme our Directors have arranged for the production of a special miniature "Spitfire" in the form of a pendant. This pendant is available beautifully enamelled in bright green with red propeller, or in bright red with green propeller; and is fitted with a split ring so that it can be worn on the lapel of a coat or costume. The pendant will be sold at 2/6, and every penny of this, without deduction of any kind, will go to a fund to purchase a "Spitfire."

This miniature forms a most delightful souvenir, and will be specially attractive to all ladies. Make sure that your mother, sisters and all your lady friends have one.

Samples of the pendant have been sent to all Meccano dealers, and I want every reader to visit his dealer at once and see them for himself. Remember that every pendant sold brings the time nearer when we can pass over to the R.A.F. the necessary amount to purchase our own "Meccano Spitfire."

* * * *

There is a possibility that transport difficulties may cause delay in the distribution of the "*M.M.*," but readers may rest assured that their copies will reach them at the earliest possible moment.



General Sir Archibald P. Wavell, K.C.B., C.M.G., M.C., Commander-in-Chief, Middle East.

Leaders in the War

XII.—General Sir Archibald P. Wavell, K.C.B., C.M.G., M.C.

General Sir Archibald P. Wavell is a Scotsman and was born in May 1883. He was educated at Winchester College, and after passing through the Royal Military College, Sandhurst, he joined the Black Watch Regiment in 1901. He fought in the South African War, and on the Indian Frontier in 1908.

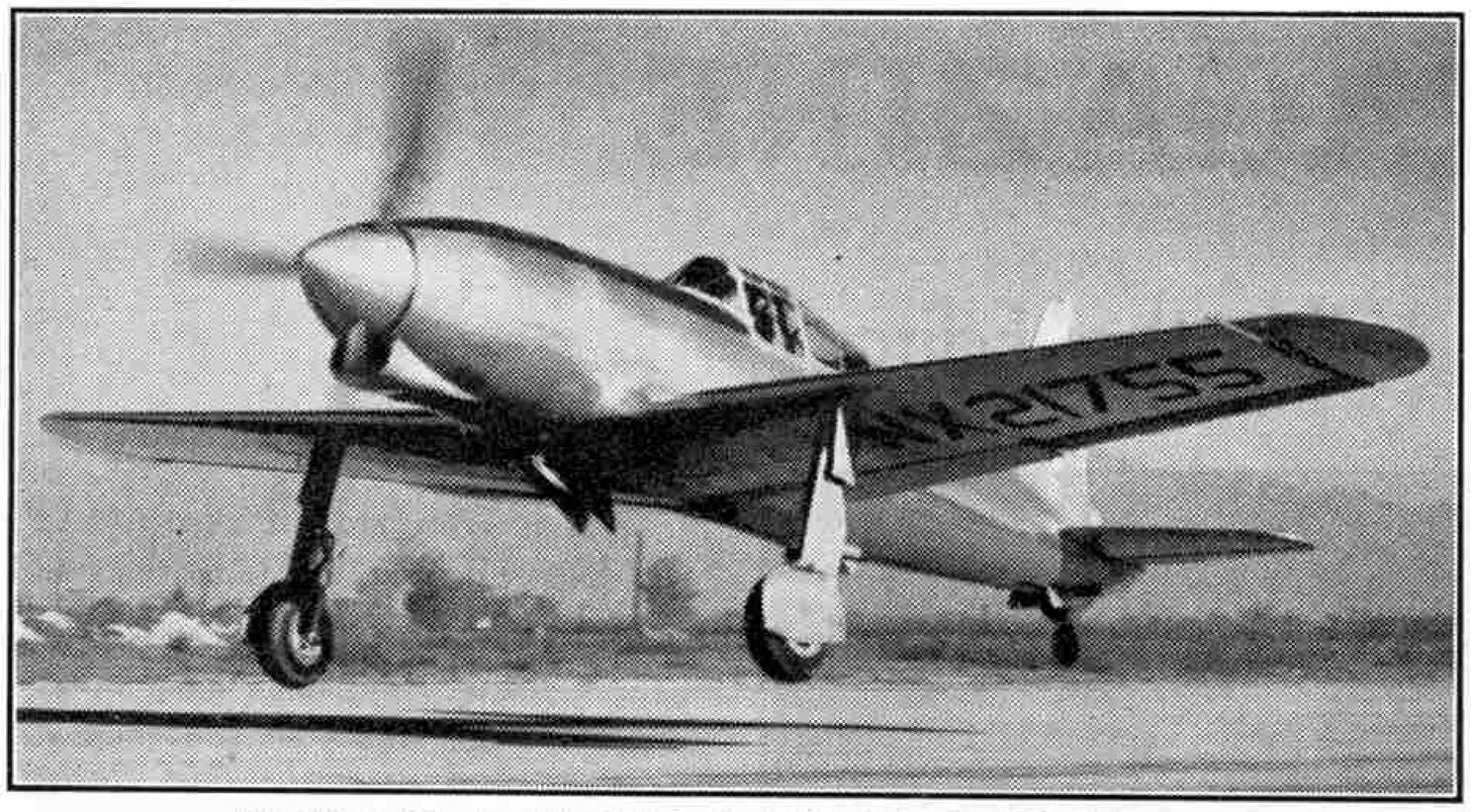
During the World War Sir Archibald served in France until 1916, and was awarded the Military Cross. From October 1916 to June 1917 he was Military Attaché with the Russian Army, and the Russian authorities showed appreciation of his services by awarding him the Orders of St. Vladimir and St. Stanislas. During the latter part of the war he was with the Egyptian Expeditionary Force as one of Lord Allenby's Chiefs of Staff.

Then followed a series of home appointments, and from 1930 to 1934 Sir Archibald commanded the 6th Infantry Brigade, Aldershot, and from 1935 to 1937 the 2nd Division, Aldershot. In August 1937 he was again sent overseas, this time to command the British Forces in Palestine and Trans-Jordan during the disturbance there. His experience of desert warfare gained while serving under Allenby proved most valuable to him in these later operations. In 1938 he returned to England to become General Officer Commanding-in-Chief, Southern Command.

When the present war broke out it was almost inevitable that his familiarity with military operations under the conditions in the Middle East should again be utilised, and he was soon on his way overseas to take charge of our military forces there.

Testing a New American Warplane

By Andrew R. Boone



The Vultee "Vanguard," which lands slightly faster than 70 miles an hour.

JOHNNIE WAGNER sucked at his oxygen tube and began dictating: "Altitude fifteen thousand. Stabilising at full throttle for speed run . . ."

Less than five minutes earlier he had lifted the smooth wings of the Vultee "Vanguard" from the narrow runway below, climbing some 4,000 ft. a minute. Now he was streaking like a scared rabbit across the sky, hitting close to 400 miles an hour in the new interceptor-pursuit, guiding 1200-plus roaring horses in its bullet nose through a flight he hoped would be smooth as a table top.

For Johnnie that day was testing America's newest warplane. She was not a souped-up racer intended to compete for speed laurels, but a production model which in coming weeks may be spitting lead from her machine guns over the English Channel. Upon her ability to rise nearly eight miles, five times faster than most commercial aircraft reach their ceiling; to roll, loop, stall and recover for chases through the sky faster than Germany's famed Messerchmitts and John Bull's Spitfires, fighting pilots shortly may depend for their lives.

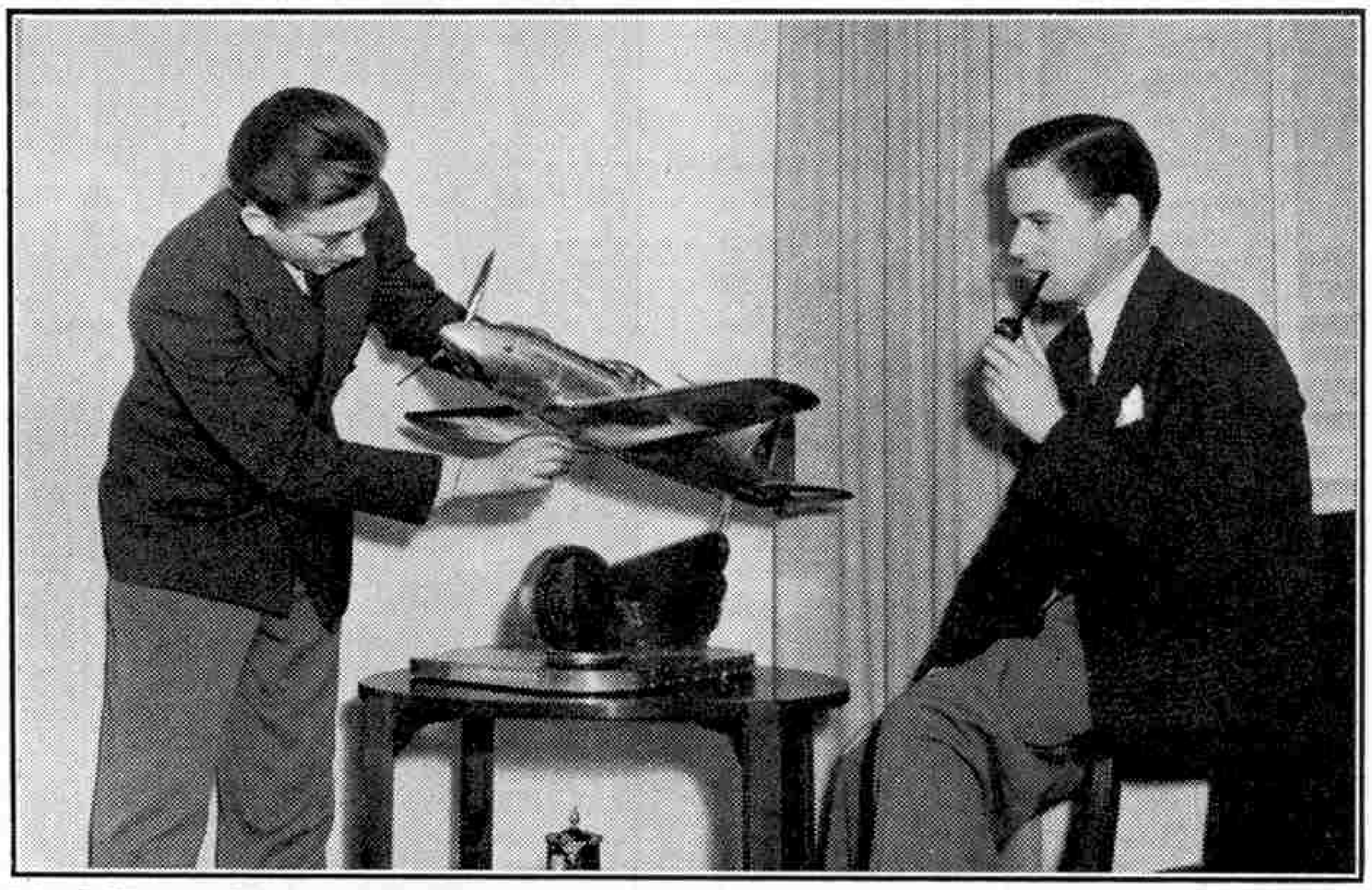
It takes diligent flying and delicate touch to keep an aeroplane zipping six miles a minute and faster on an absolutely level path, varying vertically no more than 20 ft., especially when recording flight data and observations on a wax cylinder, snapping pictures every five seconds, and watching closely more than 100 instruments and gadgets in the crowded cockpit. But Johnnie Wagner, taking occasional whiffs of oxygen as he manœuvred the three-ton fighter through several speed runs, climbed higher in a series of saw-tooth patterns, finally dropped her nose earthward, and came down after a while with part of the complex story that must be written about every new fighting airplane.

Military experts are not agreed on a definition of "interceptor-pursuit." Generally, an interceptor is expected to climb very rapidly and shoot down oncoming enemy planes, while a pursuit must perform as the name implies—pursue and "down" them wherever they may be found.

Recently I watched the "Vanguard" as she demonstrated qualities of climb, manœuvrability and speed once thought impossible in a warplane. This craft doesn't give an impression of sensational speed when you see her standing alongside a hangar, cockpit covers open, side panels off and the three wheels extended, leaving gaping holes in the wings and fuselage. Yet, when she pulls sharply from the field after an 800 ft. run and swings on her way towards the stratosphere, she resembles a graceful flying fish sailing by.

Long before the "Vanguard" left the planning stage, engineers were figuratively whittling down protruberances, smoothing the skin, lengthening the nose, even tucking the tail wheel into the narrow fuselage. How can vital parts be made easily available for quick repair in case bullets or bursting shells drive her to earth? At what speeds will she climb fastest, how can she be made to stall safely at low altitudes? These were some of the questions whose answers were written in the laboratory and the air.

From nose to tail, and across the tapered wings, speed has been built into this plane, largely by elimination.



John I. Wagner, Vultee Chief Test Pilot (right) and Harold K. Cheney, of Vultee's Aerodynamics Department, discussing, with a model, the action of the landing gear of the Vultee "Vanguard."

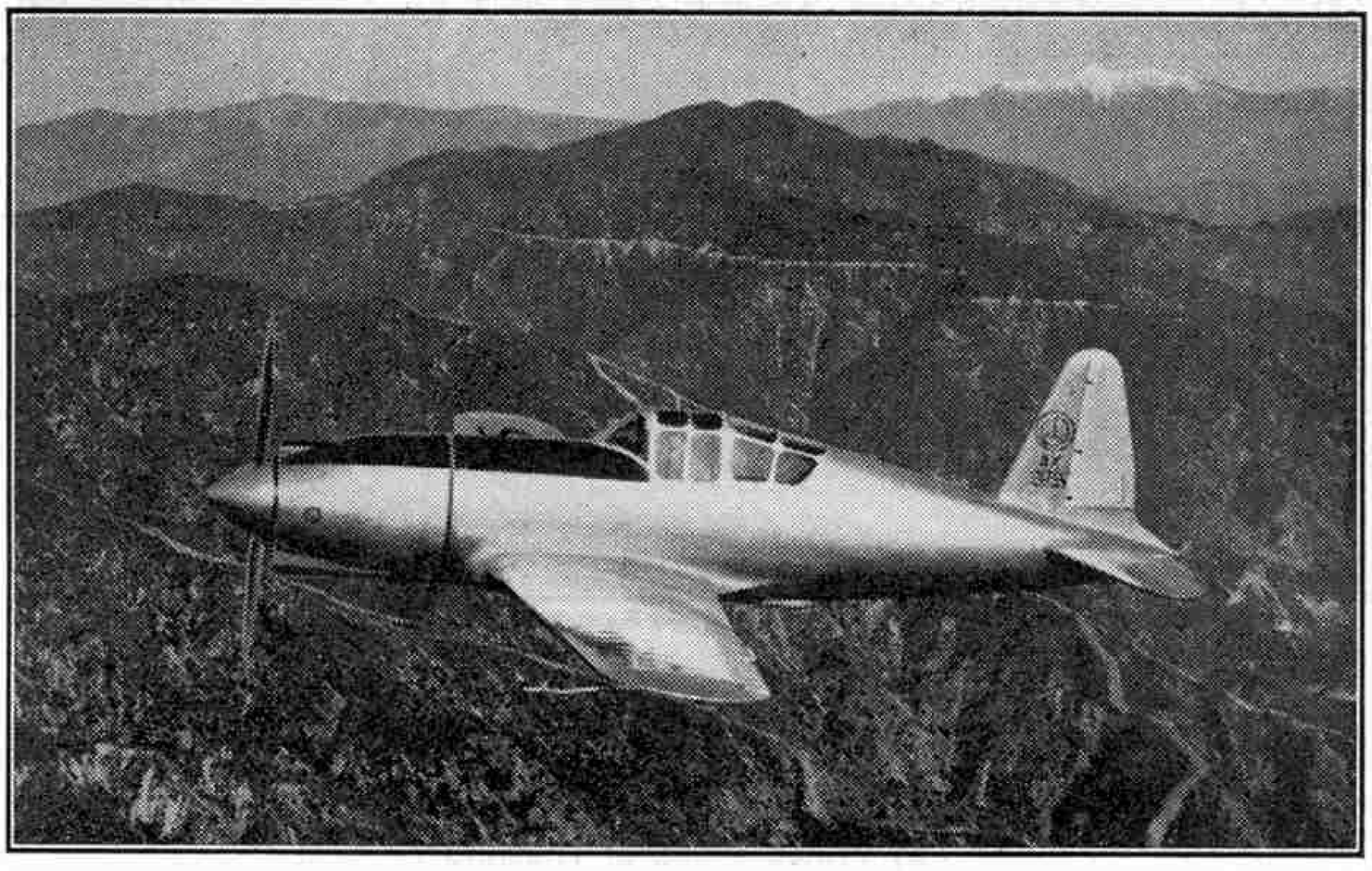
In order to overcome the resistance of a radial air-cooled engine, the nose was built forward nearly two feet, and brought to a taper at the hub of the triple-blade propeller. An air

scoop, retracted from the cockpit when flying at high speeds to reduce drag, permits cool air to circulate around the engine and exhaust at the side through an exit port that directs the flow towards the tail. Similarly, more air is pulled into the belly of the fuselage and circulated through an inverted "U" around the oil-cooling system.

As engineers moved back through the structure they continued whittling at little things whose absence would add miles to the top speed. Flush riveting, which made the skin smooth as silk, reduced drag 15 per cent. and increased speed nearly 20 miles an hour. Removing the sanded walkway on the wings gained six miles. By retracting the small tail wheel and covering the opening with metal flanges that streamline the tail, another six miles was gained.

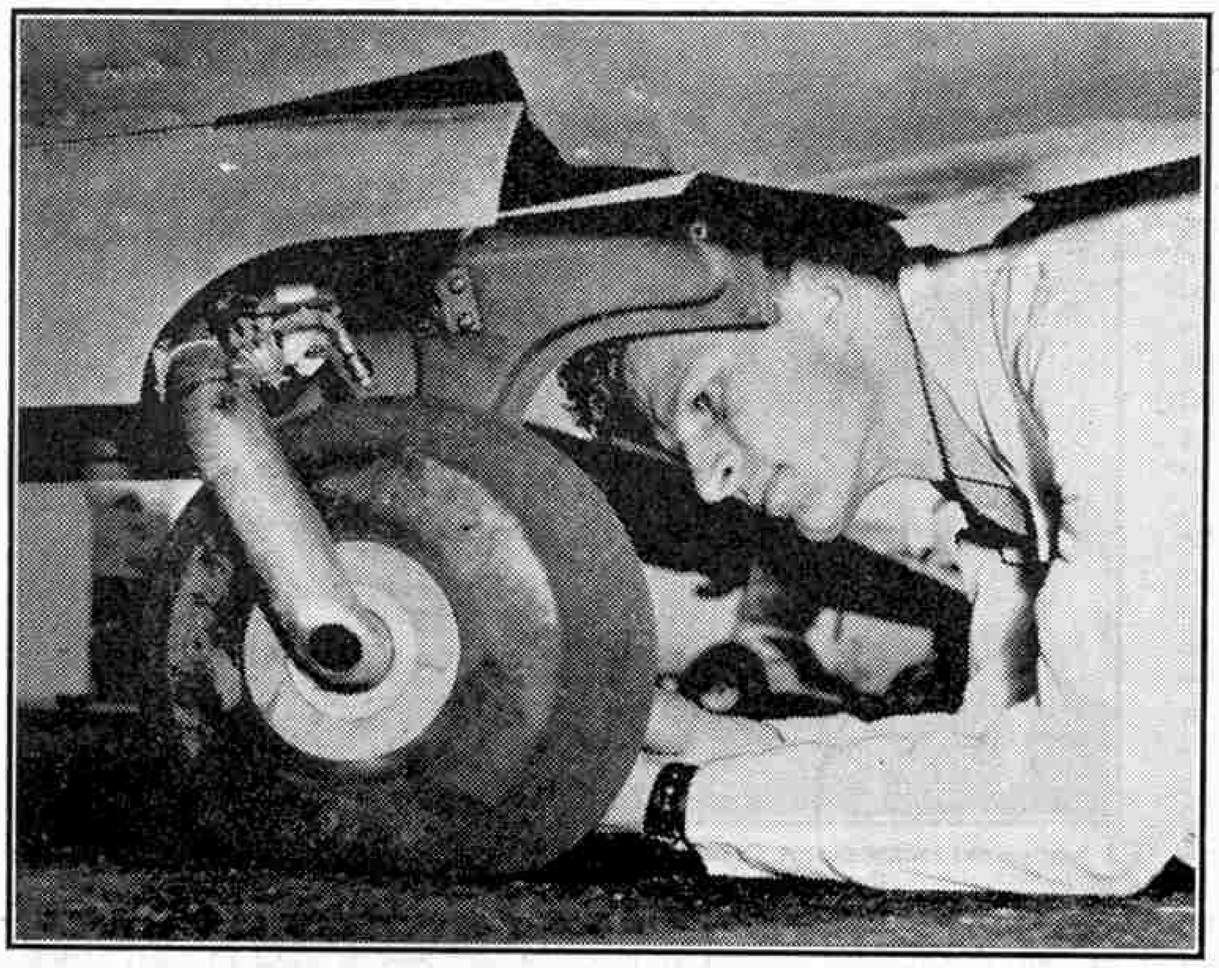
When all this had been done the ship was turned over to Johnnie Wagner with these instructions: "Simplify the flight of this complicated structure." Then Johnnie, reporting day by day how his steed was behaving, proceeded to run non-accelerated and accelerated stalls, power dives, tight loops and turns and speed-burning dashes. How to climb the swift job to fighting altitude without burning up the hard-working engine and get there faster than any pilot yet has gone up three, four, five, six miles require repeated tests.

Starting at the mile level, he piloted the trim plane through a series of saw-tooth climbs and descents, going up and down in 2,000 ft. teeth. Now he climbed while flying 140 miles an hour, 150, 155, 160. Around the mile level, he found the machine rises best at 155; 7,000 ft. higher, her most efficient climbing speed is 150. Back and forth, between 160 and 135, her velocity ranges as she moves upward. An army pilot flying to meet an enemy need only consult Johnnie's chart to know exactly how best to get up there first and fastest.



The Interceptor-Pursuit is put through all military aerobatics.

For 20 years military pilots have dreaded stalling during dog fights and spinning to their deaths. Tip stalls, wherein the machine loses flying speed and falls off on one wing, have presented an ever-increasing problem as tapered wings have come into vogue. What military flyers want is not a plane that cannot stall, but one that stalls efficiently. Many times Johnnie stalled the "Vanguard" by decreasing speed in level flight or pulling her into a stall following an increase in speed. "She's a little too abrupt," he reported one afternoon. "I'd like to smooth her out."



Close-up showing tail wheel, which retracts during flight into fuselage.

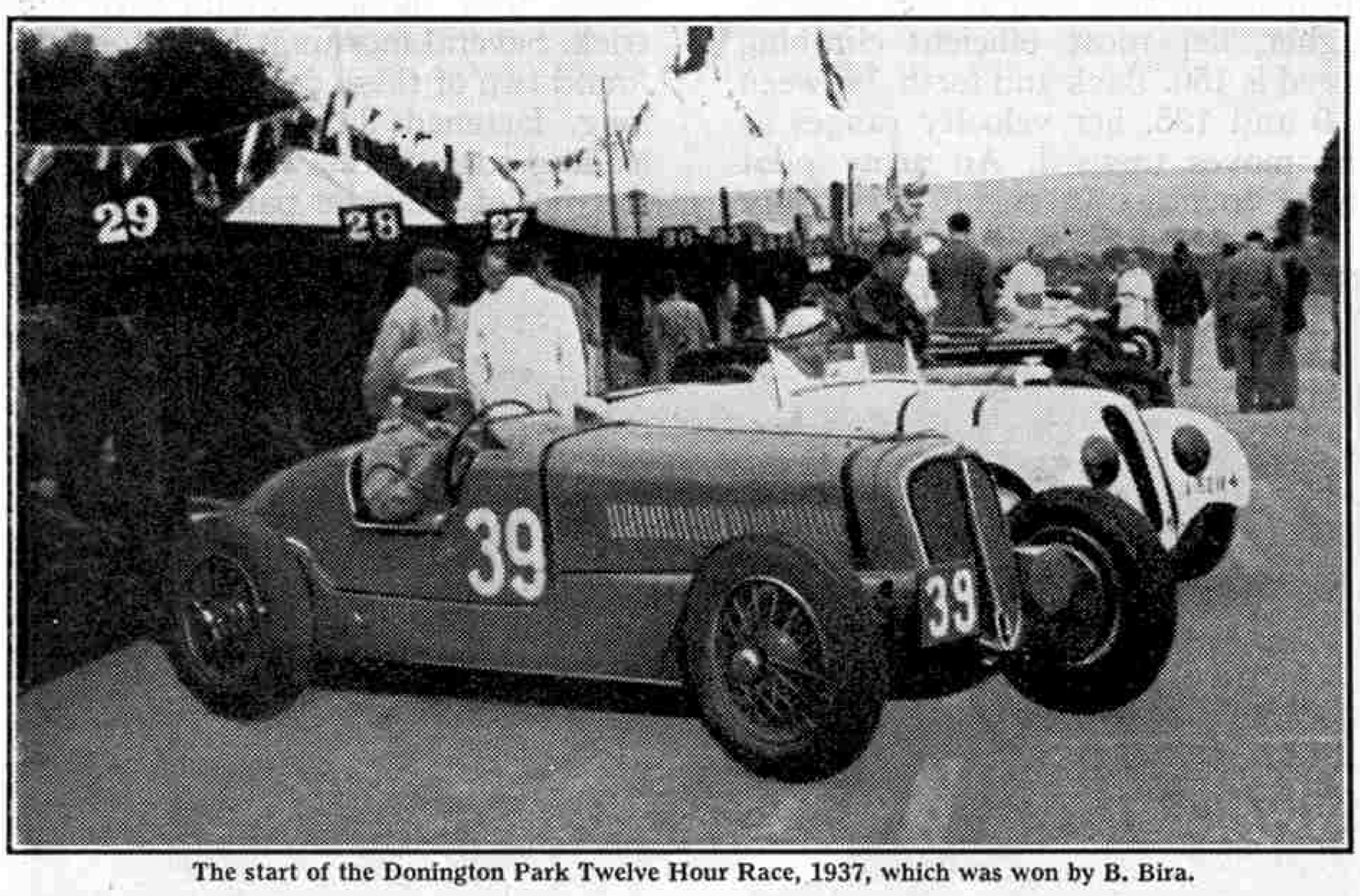
Working secretly the engineers developed a tiny half-round pencil-like gadget made of duralumin, which they thought would turn the trick. Several mornings later Johnnie found two of these devices, each 8 in. long, fastened flat-side against the leading edge of the wing, just inside the root of the outer panels. "These," explained the engineer, "will set up twin turbulences in the air stream that will progress evenly to the tips." Which Johnnie interpreted to mean that the stall would start near the centre section instead of at the tips.

Again he climbed, and again he pulled the aeroplane into a series of stalls. Several times that day I saw the machine pull up and fall straight down on its nose, with no change in direction or tendency to spin.

"What," I asked later, "do these pencils mean in warfare?"

"Fast machines sometimes tend to stall when landing, especially if you're hard pressed," he explained. "Also, a hard-pressed pilot may stall in a climb or turn. This gadget will keep their planes under control, and ought to save some lives."

Scores of instruments and ingenious devices make it possible for one man to compile a record of all that happens during violent evolutions and swift flights. A movie camera takes pictures, not of the instruments in the cockpit, but of a group housed in a small, light-proof box when Johnnie touches a button on his control stick. The camera peers through the instruments at a mirror that faces them. Dictation to the record supplies his reactions and information that not even the instruments show. For stray notes, or information he wants to keep after the needle runs off the record, he writes on a pad strapped to his leg.



The start of the Donington Park Twelve Hour Race, 1937, which was won by B. Bira.

Landmarks in a Motor-Racing Career

By Prince Chula of Thailand

AT this time of the year, if the situation had been happier and normal, motor-racing in England should have reached the height of the season. But this year no racing car has passed in or out of the gates of Brooklands, Donington, or the Crystal Palace, and these places no doubt have been put to other uses. Memories become more important when one cannot have the real thing. It is generally agreed, I believe, that my cousin "B. Bira" has been one of the most successful amateur drivers of recent years, with 20 victories out of 68 races. Out of that mass of incidents, nevertheless, some of them return more clearly to my mind than others, as I look back over the five years from 1935 to 1939.

In April 1936 Bira had entered for the British Empire Trophy Race at Donington Park and was matched against the best of British drivers. Yet driving his E.R.A. brilliantly, he easily led the field for 27 out of 100 laps, and then had to come into the pits owing to mechanical trouble. When he went on again, all hope of winning had gone, but our disappointment was to be made more bitter by intense anxiety. Bira had driven on grimly without any hope of success for 82 laps, then he did not come round any more.

As he was going down a long straight at about 120 m.p.h., a little stone struck one of his goggles. This was immediately smashed into little pieces, for being hit by a stone at that speed is almost the same as being hit by a bullet. The little pieces got into his eye and blinded Bira; and how he was able to pull the car up at that speed and not leave the road, no one will ever know. More difficult still was the task of Cyril Paul who followed him, and had most narrowly to avoid Bira's machine that had pulled up so unexpectedly in front of him. Had Paul not succeeded most brilliantly in getting through, one trembles to think what would have been the consequence.

Yet within a week, with his injured eye barely mended, Bira was racing again on the famous and difficult "round-the-houses" road circuit of Monte Carlo. He had started carefully and was holding eighth place out of 18 starters. Then in the third lap an incident occurred that altered the situation drastically. The leading car of his group suddenly went out of control, while the others were closely packed together behind. The skidding car spun round and round and caused a general mix-up, so much so that the cars hit everything in the neighbourhood, as well as each other. The result was that three cars in front of Bira stopped their engines. Bira, who was only just behind them, had the great presence of mind to dodge all the cars in the melee by using the pavement.

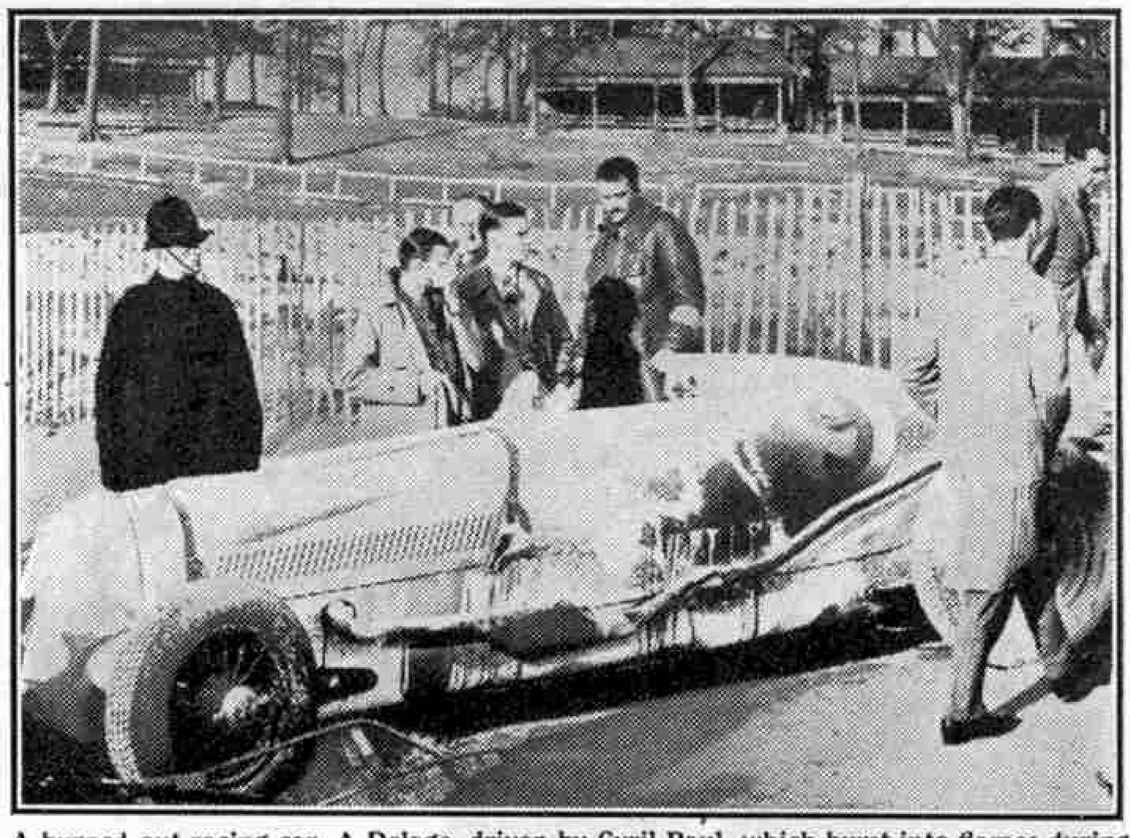
For this feat he was rewarded by getting up into second place and having a clear run behind O. Tenni (Maserati), who now had the lead. By keeping his head and driving consistently well, he gradually wore down the distance between himself and Tenni. Tenni began to find it necessary to drive furiously and produce "fireworks" in order to increase his lead. This resulted in the Italian taking a corner too fast so that he hit the curb, and was out of the race. Bira then went on calmly to win a comfortable race. This victory still ranks highest in our memories as being Bira's first; it was also scored against tremendous opposition on what is generally accepted as one of the most difficult circuits in the world.

There was a curious incident connected with this race. I had accompanied Bira after the end when he went to receive the cup from the ruling Prince of Monaco. I had omitted to wear a brassard showing that I belonged to the pits, so that on my way back I was arrested by the police. To try and explain things in that crowd, when everybody was so excited, would have been a waste of time. So taking advantage of the closely packed crowd, I decided to give them the slip, and ran for it!

It was at the International Trophy Race held at Brooklands the same year that Raymond Mays and Bira staged one of the most sensational finishes. It was a tremendous race of 260 miles in which as many as 42 cars were taking part. With Bira leading Mays slightly, they had been having a great duel together right from the beginning. As they entered the last lap, Mays had closed right up on Bira's tail. Coming off the Byfleet Banking, Mays overtook. Bira kept his head, following just behind Mays. His car was dragged on faster by Mays' slipstream, and taking the last corner very close, he pushed his blue car ahead again to win the long race by only one second. The crowd was almost delirious with excitement.

There were some races when a certain victory would be denied by a most annoying combination of circumstances. The race at Turin in Italy in 1937 was one of these. Bira's E.R.A. was then exceptionally well matched by the Maserati driven by the Italian Bianco. On the straight it was impossible for one car to overtake the other. Yet it soon became obvious that Bira was much faster round the corner and was always close up to Bianco, but could not pass through the latter blocking him deliberately. This went on lap after lap at every corner. As Bira pressed him hard, Bianco became more and more flustered. At last he missed a gear when he changed down at a corner, thereby letting Bira slip through into the lead. Bira soon proved his superiority by getting further and further away from Bianco every lap; but with victory well earned and seemingly in his grasp, he was out of the race with mechanical failure, while Bianco himself had to retire from sheer physical exhaustion, leaving another to win the race.

All kinds of factors play their parts in the winning and losing of races, and quite often it is the weather. At the International Light Car Race in the Isle of Man in 1937, Bira, driving an old type E.R.A., was matched



A burned-out racing car. A Delage, driven by Cyril Paul, which burst into flames during the 1938 International Trophy Race at Brooklands.

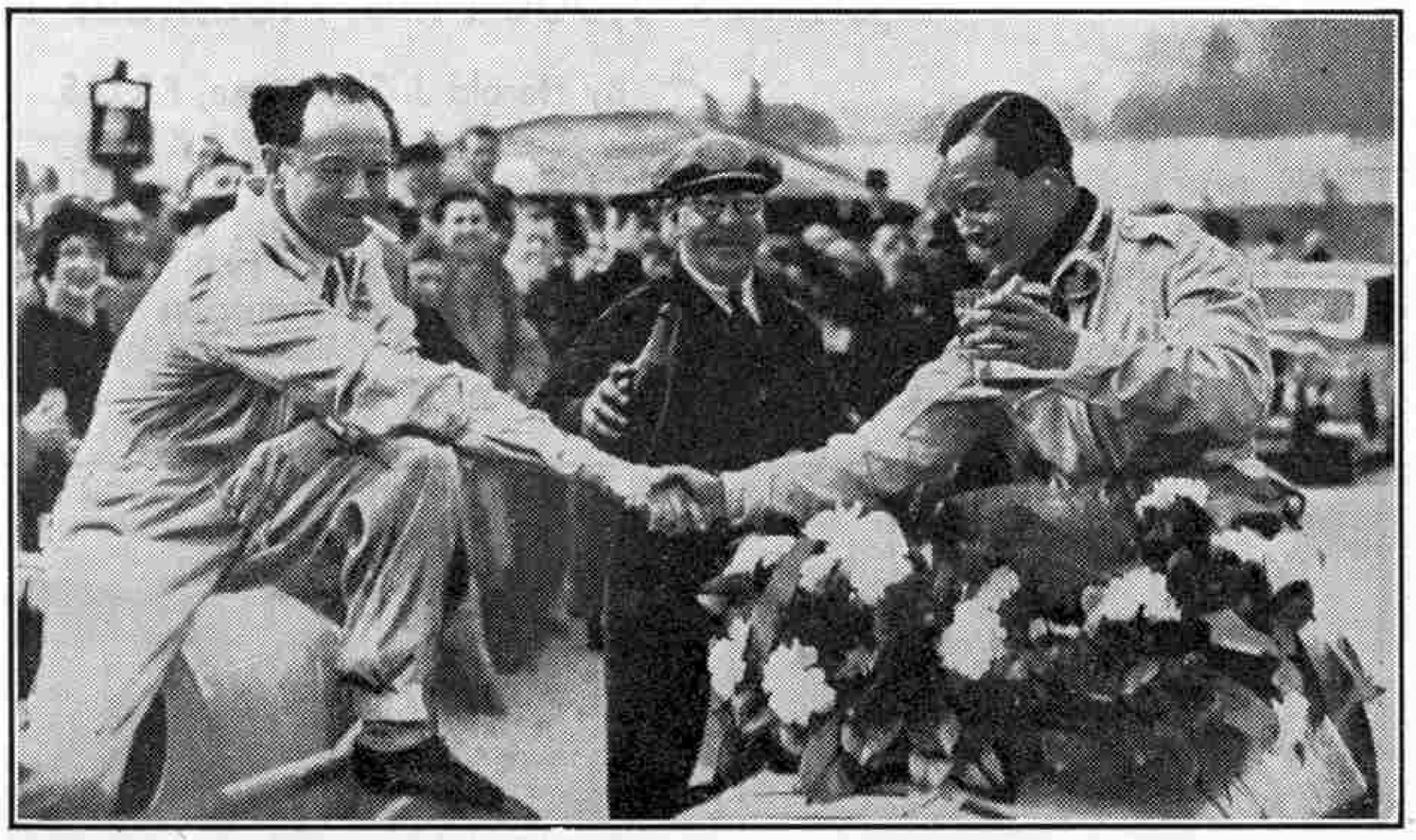
against two of the latest and much faster E.R.A. cars, fresh from the factory, as well as a host of other cars as fast as his own. The weather intervened, for it rained heavily throughout the race. Somehow Bira was able to drive much faster than anyone else against the blinding rain on the slippery roads, and he won easily after leading the race from the beginning to the end. It was so wet that as the cars tore down the promenade of Douglas they sent up sprays which made them look more like motor-boats.

Having the fastest car in a race does not mean that one can always win it easily. One of the rare occasions when Bira had the fastest car in the race was at Donington Park for the Twelve Hour Sports Car Race, when he was driving a French Delahaye with H. G. Dobbs as second driver. One or two of the drivers had started their engines as the starter's flag was lifted, and Bira, who was quite close to them, did the same. They were all made to stop their engines by officials. Bira, in his excitement, forgot to clear the engine by putting his foot on the throttle pedal before switching off. The result was that all the plugs of the Delahaye were oiled up. Eventually, when the signal to start was given, Bira could not get the car going for about seven minutes. Thus in the beginning of the race the fastest car was running last. By tremendous driving, in which Bira and Dobbs did turns of 2½ hours each, they began to overhaul the other cars, but it was not till after five hours' run that they were able to get the lead. Although they eventually won the race, it was by no means as easy as it had seemed on paper.

Motor-racing is usually considered dangerous for drivers, but this danger extends, but happily rarely, to mechanics and spectators as well. One of the worst of such cases was the accident to a French car at Brooklands in the International Trophy in 1938. Paul's Delage caught fire in the very first lap of that race, and the driver discovered his plight at the conclusion of the lap. As he was trying to escape from the blazing car, the machine jumped over an earth bank and ran into a crowd of spectators and mechanics who had gathered at that spot a few minutes earlier to watch the start. The havoc caused by the burning car was ghastly. Happily such occurrences in motor-racing are exceptional. The incident concerned me personally because I myself had stood there, but had just moved away to talk to a friend.

This was another of those races when a Bira victory seemed well within our grasp. Bira was leading comfortably by 45 secs. with only 8 laps to go, when he had to come in for a petrol refill. All eyes turned to look out for the second man, who was Maclure, driving a Riley, to see whether he could pass into the lead as Bira was immobile at the pit. The refill was smart and rapid. As Maclure was in sight but still behind, Bira's car went off still ahead. The situation thus seemed to have been saved. But within 50 yards or so Bira's car came to a stop, and he had to retire from the race through a sudden breaking of the back axle. Such dramatic changes of fortune as these make motor-racing a fascinating spectacle.

One of the most unusual drives that Bira could possibly have had was, I think, in our home city of Bangkok in December 1937. Our Thai compatriots had been deeply interested in Bira's successes in different parts of Europe; so when we returned home that winter we took back with us the famous E.R.A. car known as "Romulus." One Sunday afternoon Bira gave a demonstration run with this car along the main avenue of the city, which might be compared to the Mall in London. It was closed for the purpose by the police, and over 50,000 people lined it on both sides. The people were greatly excited by the noise and speed of the car, as a racing car had never made an appearance in that part of the world before.

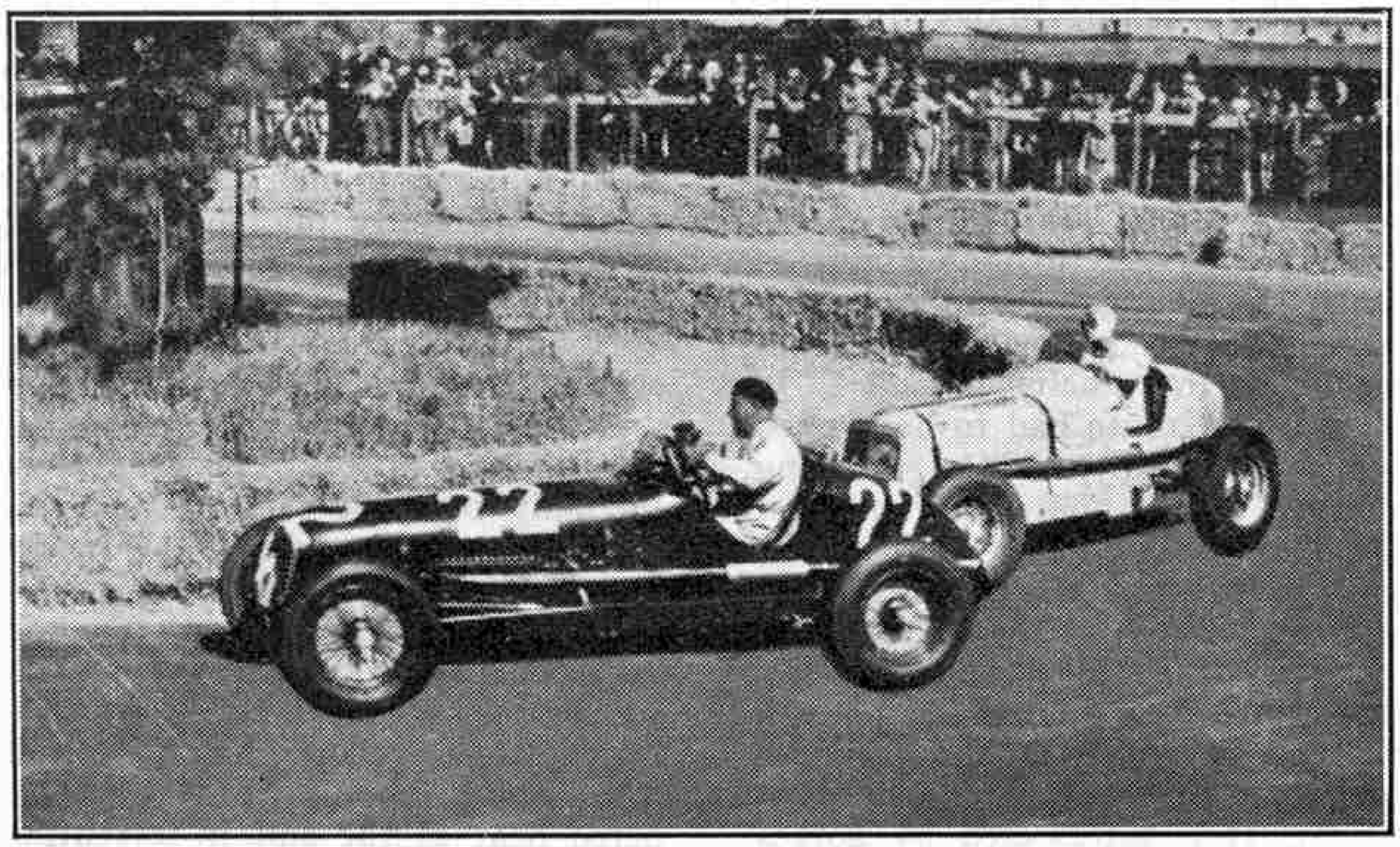


B. Bira on the right and Raymond Mays shaking hands at the conclusion of the 260 mile International Trophy Race at Brooklands in 1936. Bira had beaten Mays by a second.

Although thrills are interesting to look back to, easy races, where all things work out according to plan, are perhaps more pleasant when they actually take place. The best example of this was the Nuffield Trophy of 1939, when Bira led from start to finish, covering the 200 miles without even a stop for replenishment. This may seem dull to the spectators, but to us it was every bit as thrilling to see if all our preparation and practice, which had received minute care, would work out as perfectly in actual fact. It was by winning that event that Bira incidentally established a world record of winning four events consecutively, which was later equalled by the German champion, Lang.

I remember many years ago saying to Louis Chiron, the famous French racing driver, that the American public would find motor-races dull if there were no accidents. He agreed, but also said rather wistfully, "Here too." I did not agree with him at the time, but I have since realised that there was a lot in what he said. Although the really enthusiastic spectator who understood the fine points of the sport would naturally deplore accidents, an average person often thought of motor-racing and terrible accidents as one and the same thing. I have heard people who saw a motor-race for the first time express themselves disappointed that there were no accidents. All this is deplorable. Motor-racing is a highly dangerous sport in spite of the fact that accidents do not invariably occur. They are avoided by the superb skill of the drivers, and it is in watching the display of that skill that one should get plenty of thrills.

Such is motor-racing, with its joys and disappointments, excitement and danger. It is because of such memories that all who are connected with the sport are eagerly looking forward to the great day when it will be resumed; when once again the stirring sound of an open exhaust will fill the air at all our famous racing circuits.



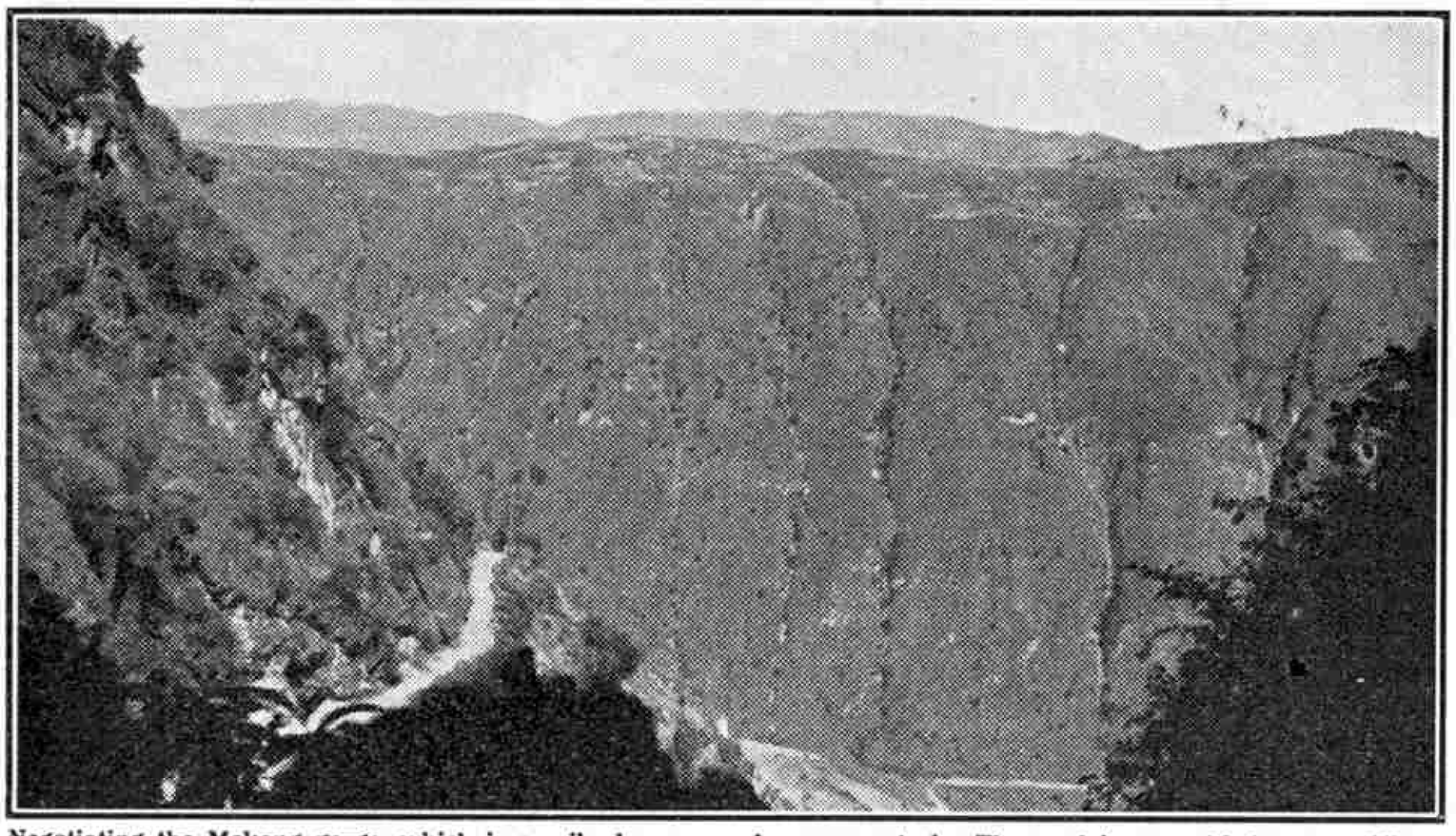
Bianca, in a Maserati, blocking the path of Bira, in an E.R.A., during a race at Turin.

The Burma Road

China's 1,000-Mile Mountain Highway

By Harold J. Shepstone, F.R.G.S.

THE much-discussed Burma Road, in many respects the world's most amazing highway, was built by the Chinese as a war measure to circumvent the Japanese blockade of their coast. By it General Chiang K'ai Shek hoped to get the munitions he needed to carry on the campaign against the Japanese.



Negotiating the Mekong gorge, which is a mile deep, proved no mean task. The road is seen skirting the cliff to the left, the narrow whitish streak at the bottom right indicating the river.

Strictly speaking, very little of the road lies in British Burma; rather, it links Burma and the outside world with Ch'ung King, China's war-time capital on the Upper Yangtze. Thus the road runs halfway across Kueichou and right across Yunnan, China's two western provinces. It touches the Burmese frontier at Namkham, from which point a branch line runs north to Bhamo on the Irrawaddy, and another south to Lashio, the terminus of the Rangoon-Mandalay Railway. The distance between Bhamo and Ch'ung King is about 1,000 miles.

A part of this long road was built before the war with Japan began, but the essential link with Burma, which traverses the most difficult country, was not started until the late autumn of 1937, and was built in the short space of one year—a remarkable achievement. As late as December 1937, no work had been done on the 280-mile stretch between the Burmese frontier and Hsia Kuan, halfway to K'ung Ming, the capital of Yunnan; and it was not until December 1938 that the first convoy of munition lorries passed up the road from Bhamo. These two last sections of the road, from Bhamo to Hsia Kuan and from the latter place to K'ung Ming, a total distance of some 700 miles, constitute what is popularly known as the "Burma Road."

The road follows closely the track of the old caravan route, along which caravans of mules still bring silk from China, taking 70 days to make the journey. Marco Polo traversed it over six centuries ago. It was impossible to convert this ancient highway into a roadway suitable for wheeled vehicles, for it simply climbs the steep ranges by long flights of stone steps, crossing the rivers by old, rickety suspension bridges swung on iron chains.

So a new route had to be blasted for the roadway, calling for long surveys among the mountains and considerable organising skill on the part of the Chinese engineers who were responsible for the undertaking. The physical difficulties were immense. Western Yunnan is a plateau rimmed by mighty mountain ranges towering 10,000 ft. and more in height. It is intersected by gorges several thousand feet deep, through which great rivers plunge their way to the sea, including the two mighty streams the Salween and the Mekong.

Some idea of the wild mountainous character of the country may be gauged when it is stated that if a dweller in a village should desire to visit a friend in another village in the same valley, which may be only a few miles away as the crow flies, he has first to climb the ridge, skirt along it, and then descend the mountain again, probably a full day's hard tramp. A more difficult country for communication could hardly be imagined.

Not only is the country very mountainous, but it is also sparsely inhabited. There are only four small towns along the route, the largest having a population of some 25,000. They are really Chinese colonies planted here at the time of the first Chinese settlement of this region in the second century B.C. One can travel 50 miles and more without striking a house, let alone a village.

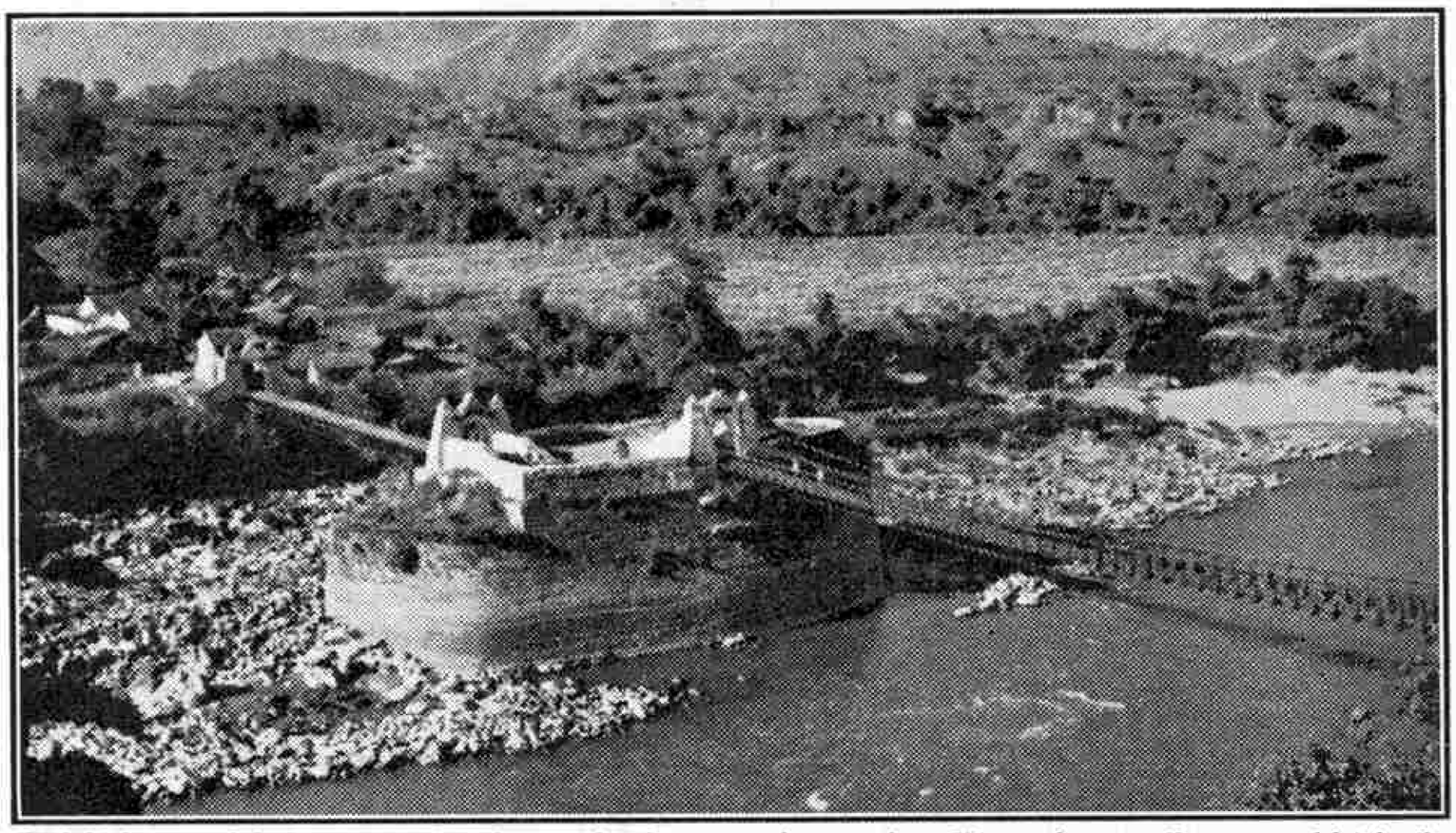
As a result labour had to be brought from places 100 miles and more from the line of the road. The services of an army of 170,000 men were requisitioned for the task, superintended by over 200 Chinese engineers. The labourers were mostly mountain folk. They were by no means all Chinese, many of them being Lolos and Li Su. They received no wages, for it was conscripted labour. Each village and district was called upon to supply a fixed number of men for a settled period, generally one month at a stretch. This month's labour for the government was in lieu of taxes.

None of these labourers had ever seen a wheeled vehicle; the mule and camel were the only beasts of burden they knew. The road was virtually built by hand. The men carved a pathway out of the rocky mountain sides with hoes and primitive hammers, carried the road metal up from distant river beds in small wicker baskets, and rolled it with huge stone rollers hand-chipped from granite boulders. Under the fierce heat of the sun, in torrential rains, in wind and storm they

toiled, hacking a path over the mountains. China was fighting for her very existence and the work could not be delayed.

The last section of the route, that from Hsia Kuan to the Burmese frontier, 280 miles in length, proved the most difficult. It never would have been attempted had not the Japanese blockade made a road to Burma a vital necessity. The ranges are steeper and higher and the valleys more deeply cut on this section of the road than on the other. The rainfall is heavier, the snow line lower; added to which the mountains are entirely clothed in thick timber and vegetation. The track, too, had to be carried across the Salween and Mekong rivers. The mountain slopes were only negotiated by the laborious construction of a series of hairpin loops, one above the other, up and down which lorries have to be carefully driven.

Hsia Kuan is perhaps the most interesting spot on the route. It is a natural fortress guarding the entrance to a picturesque plain, and is entirely enclosed by the snow-capped peaks of the Tsang Shan range of mountains. In the centre of this little plain is the city of Ta Li, standing on the shores of a beautiful lake. Ta Li is famed as the source of the celebrated Ta Li marble, and is a charming old-world Chinese hamlet with its ancient



In bridging the Salween the road makers took advantage of an ancient Chinese fort standing on an islet in the centre of the waterway.

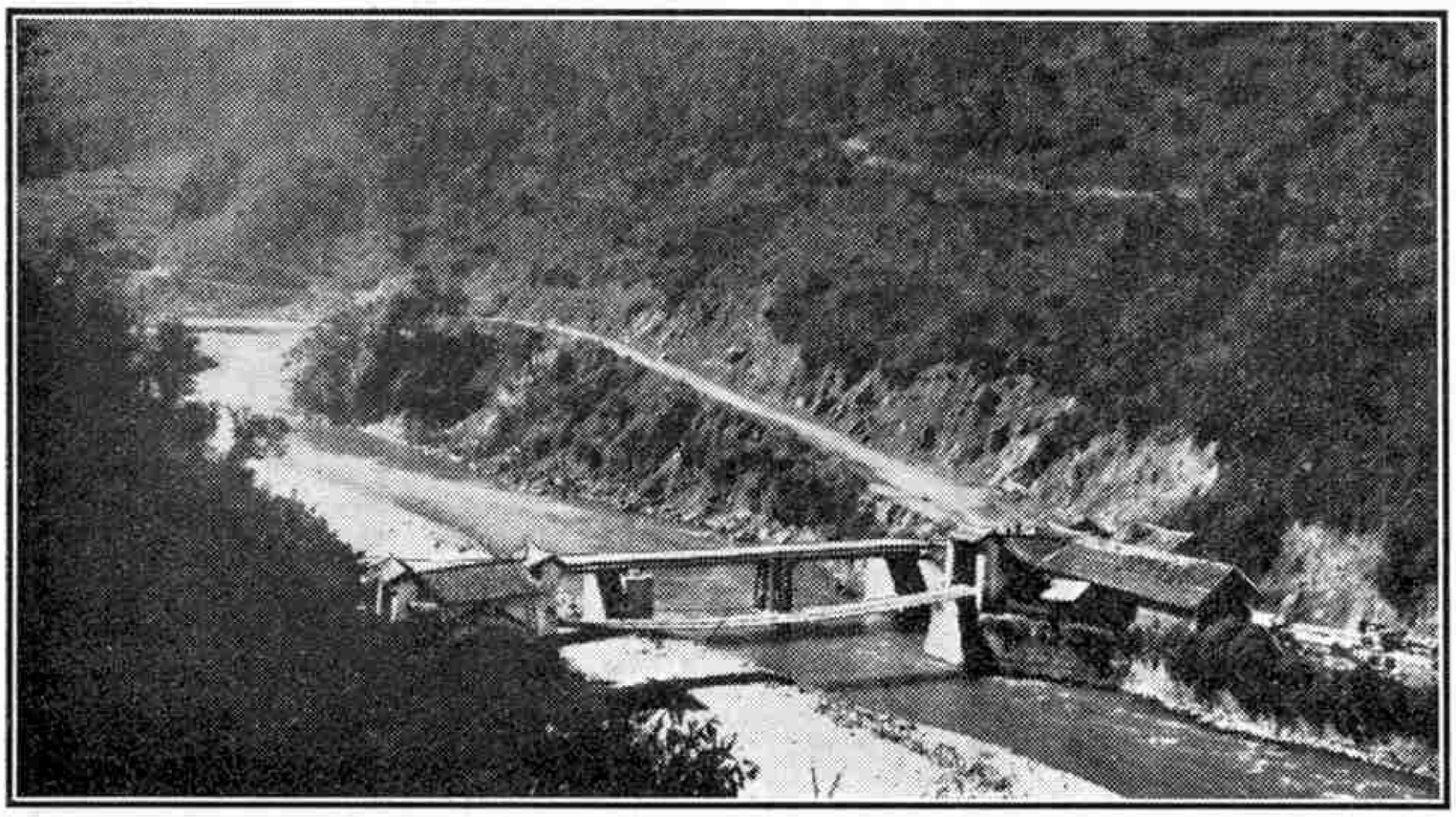
During the first three months of the opening of the road very little traffic passed along it. By March 1939, however, 100 lorries a day, carrying some 200 tons of war material, was moving along it. In the rainy season, which lasts from July to October, this traffic was reduced by landslides to 10 to 12 lorries a day. The lorries were driven by Chinese and Burmese drivers.

At first there was plenty of incident. Turning a bend in the road a lorry would run into a caravan of 15 or 20 mules; and this being their first introduction to the self-propelled vehicle, the mules promptly took fright and bolted. With angry shouts their drivers dashed after their frightened charges, fearing they would lose their heads and disappear down the steep precipices. Strictly speaking the caravans have no right to the road, as they are supposed to keep to their own track. Lorries have fallen over the cliffs, generally as the result of skidding in wet weather. They have broken down and had to be towed or wait for days for repair.

Since those exciting days, however, extensive improvements have been made to the road by American engineers in removing dangerous curves, re-grading hazardous stretches, strengthening the bridges over the rivers, and arranging facilities for dealing with the landslides that are liable to occur in the rainy season. Some 70,000 labourers are said to have taken part in this work. Nevertheless, journeying over the road is still something of an adventure.

Although this remarkable highway was built by forced labour, China is said to have expended a sum of 16 million Chinese dollars upon it. This sum includes not only the original cost of the road, but the recent improvements, the purchase of a fleet of 1,000 lorries, and the establishment of repair depots and landing places for aeroplanes along the route. Last July we agreed to close the road for three months to the end of the rainy season to the transit of arms and munitions, petrol and railway material. China can, of course, still use the road for ordinary commercial purposes, lorries carrying only enough petrol for the return journey.

Experts are not agreed as to the commercial possibilities of the road. The lorries that carried up war material brought back silk and minerals such as tin, tungsten and antimony, which were exported to help maintain Chinese currency. Apart from this war traffic, commodities worth £2,000,000 passed along the road from Burma to China within the 11 months ending February last.



These two bridges over the Shim Pi Ho, a particularly deep river gorge in Yunnan, show how closely the caravan route and motor road follow one another. The swing bridge is on the caravan route and the more substantial structure is on the motor road.

temples and pagodas. Mr. Patrick Fitzgerald, who has travelled over the Burma Road several times carrying out anthropological and geographical research work in this region, and to whom I am indebted for the pictures accompanying this article, declares it to be one of the most beautiful spots on the globe.

RAILWAY NEWS

New Beyer-Garratt Locomotives for Rhodesia Railways

The splendid 4–6–4 + 4–6–4 "Garratt" locomotive illustrated at the foot of this page has been built by Beyer, Peacock and Co. Ltd., for the Rhodesia Railways. It is one of four of a new Beyer-Garratt locomotive designed for hauling mail trains of about 500 tons weight at speeds up to 50 m.p.h. between Mafeking and Bulawayo. This section is 484 miles in length, and along it there is no intermediate locomotive depot, apart from an inspection pit and coaling stage about half way.

The design is only the second with the wheel-base arrangements 4–6–4 + 4–6–4 to be built, and has many specially interesting features. Chief among these is the streamlining of the front tank. As the length of run is so great, and triangles are available at both Bulawayo and Mafeking for turning the engines, these will work chimney first in both directions, and the arrangements generally have been made with a view to this forward working. The front tank design also will help smoke to clear the cab. Another point is that the sides of the tanks have rounded corners, the bottom plate being turned up and riveted about a foot up on each side.

Each engine has four cylinders of diameter 17½ in. and stroke 26 in. The coupled wheels are 4 ft. 9 in. in diameter. The total evaporative heating surface is 2,336 sq. ft. and the superheater surface is 494 sq. ft. The grate area is 49.5 sq. ft. and the boiler pressure is 180 lb. per sq. in. The coal capacity is 10 tons and 7,000 gallons of water can be carried. The weight of the locomotive in working order is 179.5 tons, and the tractive effort is 42,750 lb. at 85 per cent. boiler pressure, or 37,720 lb. at 75 per cent.

The engines are numbered 271 to 274. They were shipped in three main pieces, and at first were employed on the section between Bulawayo and Salisbury, while waiting for certain speed restrictions between Mafeking and Bulawayo to be removed. They have already given highly satisfactory results in service, and are remarkable for their excellent tracking properties.

G.W.R. Locomotive Classification Explained

The G.W.R. system is to classify by engine numbers, and it is usually the second, or hundreds figure of the four that gives the clue. Thus for the 4–6–0 "Hall" class the first series were numbered 49xx, the x's representing any figure from 0 to 9 in the tens or units positions. As this popular type was multiplied 59xx was called into use, and now there are to be "Halls" numbered 69xx.

This scheme ensures that all engines of a class shall be numbered together in accordance with a recognisable plan. In the case of most of the named locomotives, a further standardised clue is given to the wheel arrangement in classes where the names are in "King," "Grange" and other well-known groups, often arranged in batches alphabetically.

Of the numerous 4–6–0 types the "Kings" are numbered 6000-29. The "Stars," the first 4–6–0 four-cylinder series, are somewhat intermingled with the newer and more powerful "Castle" version, which has proved so successful and is now a paramount design. The "Stars" were numbered 4000-72, and the first "Castles" followed straight on from 4073-99. Afterwards as building proceeded 50xx became the standard "Castle" numbering. In this list there are now some exceptional additions, such as No. 111 *"Viscount Churchill,"* a rebuild without altering its number of the former 4–6–2 *"The Great Bear,"* and No. 100 *"A1 Lloyds,"* renamed and renumbered when rebuilt from a "Star" in honour of the great London insurance institution. Nos. 4000 *"North Star,"* 4016 *"Somerset Light Infantry,"* 4032 *"Queen Alexandra"* and 4037 *"South Wales Borderers,"* originally "Stars," also are now rebuilt as "Castles," and there are 25 engines in the 50xx series, bearing names of Earls and Abbeys, that have "Castle class" added helpfully in smaller lettering on the nameplate. In the two-cylinder classes, "Saints" are 29xx; "Halls" are 49xx, 59xx and 69xx, as already noted, "Granges" are 68xx; and "Manors" are 78xx.

There are now remarkably few 4–4–0's on the G.W.R. for a line of this size. The survivors of the "Duke" and "Bulldog" classes are numbered 32xx and 33xx-34xx respectively. The modern, light Cambrian engines are 3200-3221. Of the 2–6–0 types, the first inside-cylinder "Aberdares" (coal engines) are 26xx, while the numerous newer outside-cylinder, mixed traffic engines carry numbers 43xx, 53xx, 63xx, 73xx, 93xx. The 2–8–0 mineral locomotives are 28xx and 38xx, and the nine larger wheeled "Perishable goods" engines carry numbers 4700-8. The ex-Government Great Central type are 30xx. The 0–6–0's of the older classes are 23-25xx; the newer type dating from 1930 onward, known as the "2251" class, are numbered 22xx. The three 2–4–0's of former Midland and South Western Junction origin are 1334-6.

Of tank engines the 0–4–2 branch type are 48xx and 58xx. There are very large stocks of pannier general service and shunting 0–6–0 tanks, old, newer and quite modern. Their group numbers are 54xx, 64xx, 74xx, 36xx-37xx, 57xx, 67xx, 77xx, 87xx and 97xx, as well as some lower odd numbering. The 2–6–2 designs are dealt with more fully in a separate paragraph. Their main series are 45xx, 55xx, 31xx (the original passenger design), 41xx, 51xx and 61xx. The 2–8–0 mineral tanks are 42xx and 52xx, and conversions from these to 2–8–2 with large bunker are 72xx. The complete hundreds of inside-cylinder 0–6–2Ts built to the design introduced just after grouping for South Wales services, mainly on branches, run from 5600 to 5699 and from 6600 to 6699.

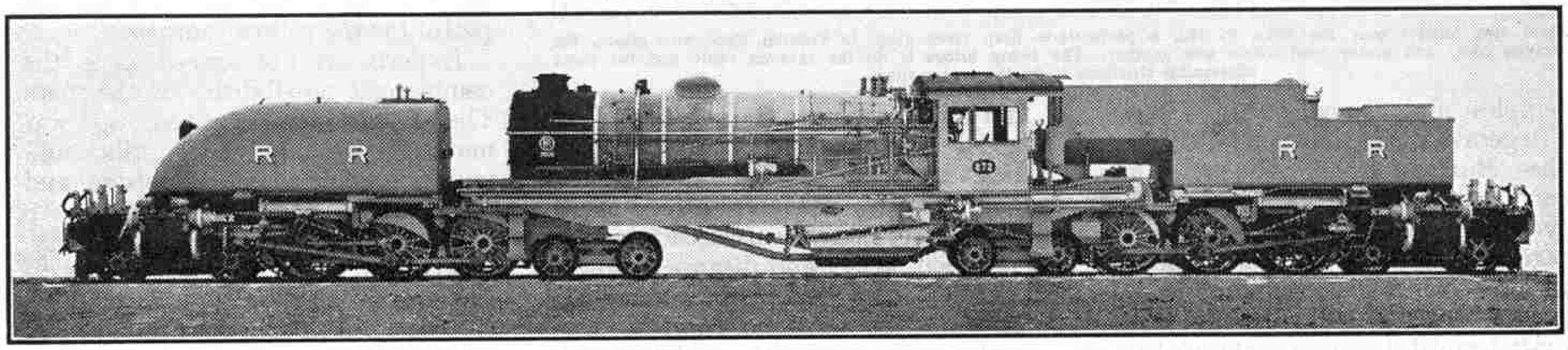
"The Home Guard"

A typical wartime ceremony marked the official naming of one of the existing L.M.S. "Patriot" three-cylinder 4–6–0 express engines. This engine is No. 5543, to which the name *"The Home Guard"* has been given. Many thousands of railwaymen are serving in specially trained companies of the Local Defence Volunteers, and the newly-named locomotive is an appropriate tribute to a notable National Service.

S.R. Withdrawals

Engines withdrawn from traffic during June included "D1" Stroudley 0–4–2Ts, former L.B.S.C.R. Nos. 2221, 2226 and 2356. Another locomotive withdrawn was "14" No. 2034, the last of her class. At first No. 2034 was numbered 34. She was one of the smaller series of 4–4–2Ts built at Brighton, but rather curiously dimensioned. Though superheated and provided with piston valves, together with cylinders of the liberal diameter of 20 in., she and her four sisters have each a boiler heating surface of only 886 square feet, the 18-element superheater yielding another 250 square feet.

A fine 4-6-4 + 4-6-4 Beyer-Garratt locomotive designed for hauling mail trains of about 500 tons on the Rhodesia Railways. Photograph by courtesy of Beyer, Peacock and Co. Ltd., Manchester.



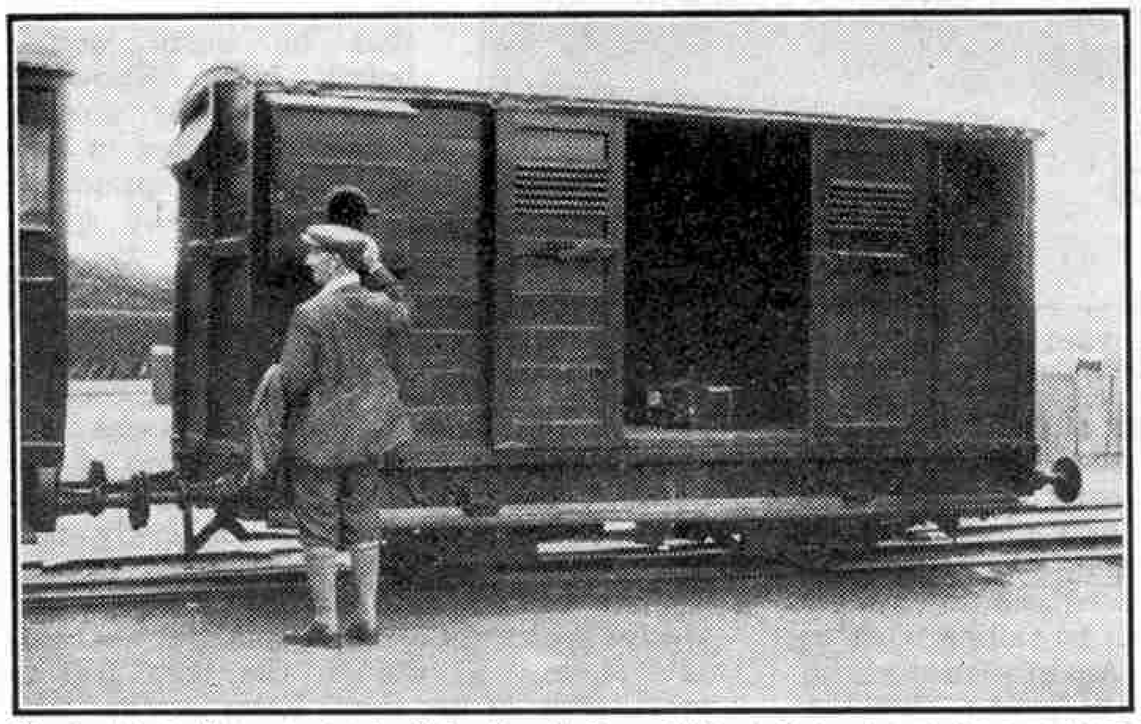
A Booking-Office on Wheels

One of the most curious railway booking-offices in the country is surely that of the 2 ft. 3 in. Tal-y-llyn Railway, connecting Towyn, on the Cambrian Coast, with Abergynolwyn, seven miles inland. More than ordinary interest attaches to the accompanying photograph of this "booking-office on wheels," which consists simply of a ticket-window inserted in the side of the guard's van, by the fact that the Tal-y-llyn is the only narrow-gauge railway in North Wales, with the exception of the Snowdon Mountain line, which is a rack system, to be operating a regular public passenger service at the present time. True, this service consists of only two trains in each direction, and these run only on Mondays, Wednesdays, and Fridays, but it is still a service!

The Tal-y-llyn Railway possesses two small tank locomotives, each built in 1865, the year the railway was opened, and apart from the "booking-office on wheels" another curious feature is that the passenger compartments have no door handles on the right-hand side. The reason for this omission is quite simple; there are no platforms on the right-hand side going inland at any of the stations.

Of the other narrow-gauge railways in North Wales that were still operating passenger services at the outbreak of war, the Vale of Rheidol (G.W.R.) 1 ft. 11½ in. gauge line between Aberystwyth and Devil's Bridge did not reopen for the summer season this year, nor is the historic Festiniog Railway now running an ordinary passenger service. In view of the keen war-time demand for iron and steel salvage, mentioned in a recent "*M.M.*" article on derelict railways, proposals have recently been put forward for taking up the permanent way of the closed Welsh Highland Railway, but it is understood this would require special Parliamentary powers.

D. S. BARRIE.

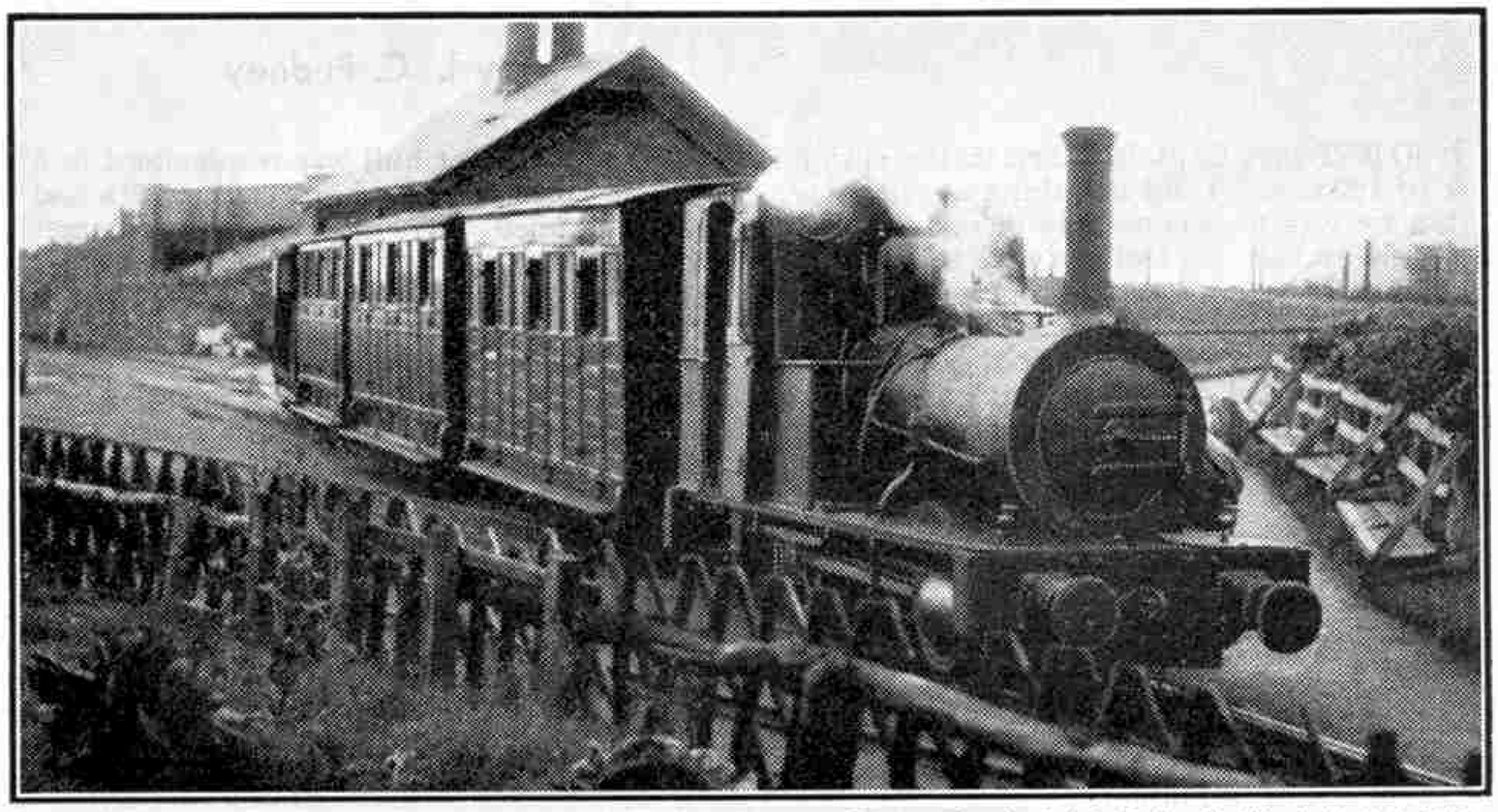


The booking office on wheels, Tal-y-llyn Railway. This photograph and the one above are by D. S. Barrie.

G.W.R. 2-6-2 Tank Engines

Of the passenger types, the well known "5100" class is now represented by 100 engines, all working from provincial sheds and actually numbered 4100-39, 5100-10 and 5150-99. They have two outside cylinders with diameter 18 in. and the long stroke of 30 in. favoured at Swindon. The driving wheels are of 5 ft. 8 in. diameter, the total heating surface is 1,349 sq. ft., and the boiler pressure 200 lb. per sq. in. The tank capacity is 2,000 gallons of water, and the total weight in working order 78½ tons. In the London, Slough and Reading area the powerful "6100" class, carrying the higher pressure of 225 lb. per sq. in., comprises 70 locomotives, numbered consecutively 6100-69.

In the mixed traffic groups the 45xx class is a smaller and lighter general service design with 4 ft. 7½ in. driving wheels and a total weight of 61 tons. Engines of a new intermediate series now in hand have a boiler pressure of 225 lb. per sq. in., the 81xx being slightly smaller than the 31xx type, though with 5 ft. 6 in. driving wheels compared with 5 ft. 3 in.



A Tal-y-llyn Railway passenger train at Wharf Station, Towyn. The engine is 0-4-0 T No. 1 "Pretoria," built in 1865. The G.W.R. (Cambrian Section) line passes at the back of the station.

Interesting Facts About American Railroads

There are more miles of railway in the United States than in all of South America, Asia, Africa and Australia combined.

A perfectly straight track 78.86 miles in length on the Seaboard Air Line Railway between Wilmington and Hamlet, North Carolina, is the longest stretch of track without a curve in the United States.

The highest point reached by any railroad in the United States is the summit of Pike's Peak in Colorado, 14,109 ft. above sea level, which is served by the Manitou and Pike's Peak Railroad.

In the United States there are 1,539 railroad tunnels, with an aggregate length of 320 miles.

The Cascade Tunnel of the Great Northern Railroad through the Cascade Mountains in Chelan and King Counties, Washington, is 7.79 miles in length, and is the longest railroad tunnel in the Western Hemisphere.

New Engines from Swindon Works

"Hall" class 4–6–0 engines lately put into traffic on the G.W.R. are as follows: 5996 "*Mytton Hall*"; 5997 "*Sparkford Hall*"; 5988 "*Trevor Hall*"; 5999 "*Wollaton Hall*"; 6900 "*Abney Hall*"; 6901 "*Arley Hall*"; 6902 "*Butlers Hall*"; 6903 "*Belmont Hall*"; 6904 "*Charfield Hall*"; 6905 "*Claughton Hall.*" It will be seen that "*Abney Hall*" is the first of the new series with numbering 69xx.

Nos. 2211-20 are new 0–6–0's in service, and 0–6–0Ts Nos. 3675-9 and 2–8–0 No. 3823 also are in traffic.

Irish Notes

The two Drumm battery-driven units, each consisting of two bogie coaches articulated at the centre on one frame, and which can if necessary be run coupled together, have now been in service over seven years between Dublin and the coast resort of Bray. They have evidently proved a success, as additional sets are under construction. Seating is provided for 140 persons, and the batteries are recharged at each end of the run each way.

Tank engines at work in the Dublin area of the G.S.R.(I) include two 4–6–0's from the former Cork, Bandon and South Coast Railway, and five modern superheated 0–6–2s of Class 13, numbered 670-4, that have boilers, motion &c. interchangeable with the latest G.S.R. tender 0–6–0 class. There is also No. 850, a large 2–6–2 with outside cylinders and Walschaerts gear, together with older engines.

A reader points out that the much rebuilt "400" class of G.S.R.(I) 4–6–0's still presents at least six variants in seven engines. Cylinders and boilers vary in size, some of the engines have Caprotti valve gear and others Walschaerts gear, while one is provided with a large stovepipe chimney and Lemaitre blastpipe.

New engines reported are No. 802 "*Tailte*," the third of the fine new three-cylinder "800" class, G.S.R.(I), and 2–6–0 No. 102 of the Northern Counties Committee (L.M.S.).

More Black L.M.S. Engines

On the L.M.S. black engines are now appearing with the numbers in gilt, unshaded block numerals, as originally used on the 8027 class mineral locomotives. This is presumably a wartime economy measure, as is the turning into traffic from works, after overhaul, of certain express passenger 4–4–0 compounds and 4–6–0 "Jubilee" class engines that are painted black instead of the customary crimson lake.

A Tough Lone Voyager

By L. C. Pudney

I FIRST met Captain Clark in the spring of 1938, and I did not think at the time that he was to become one of my greatest friends. In fact, my feelings were the reverse of friendly when I arrived one morning at the Camber, an inlet of Portsmouth Harbour used for small boats, and discovered what I considered an unpleasant-looking barge moored alongside one of my speed boats.

"Ahoy there!" I bawled at the *"Girl Kathleen,"* as I saw her name was. A little grey-haired man poked his head out of the tiny cuddy.

"Morning, stranger!" he drawled. "What's eating yer?"

"You've got a nerve tying your old wreck near my varnish!" I yelled.

At this the old boy gave a sound resembling a snort, removed his clay pipe, spat meditatively into the Camber, and spoke.

"Old wreck? Are you calling the old *'Katy'* a wreck, you-you-you lubber? Let me tell you that one day the old *'Katy'* will set up a record. I'm hoping to get a few alterations done to her cabin and then I'm setting a course for the Americas!"

I could not help but be interested in this strange little man who spoke so lightly of an Atlantic crossing, so I availed myself of his invitation and went aboard his boat. The *"Girl Kathleen"* was quite a sound job, in spite of my first impressions, and had been built about 50 years ago in Cornwall. The accommodation was a small cabin for'rd, and a compact little engine-room aft contained an "Atlantic" heavy-duty engine. The centre of the boat was the hold. A single mast was stepped in the for'rd cabin, and the boat was gaff-rigged, that is the main-sail was attached to a small boom at the top, instead of going to a point as in modern yachts.

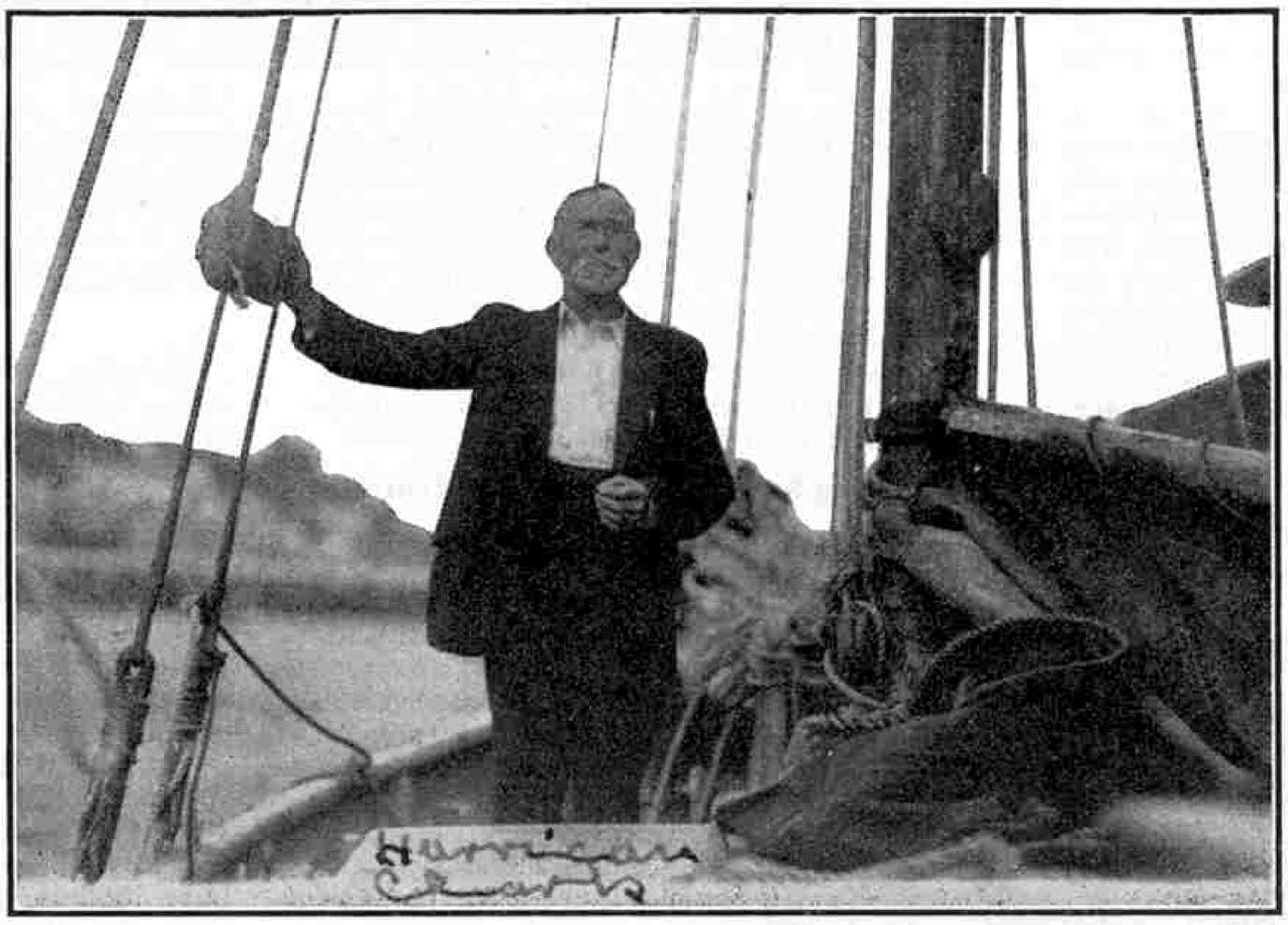
The Captain told me of his plans to make an attack on the Atlantic as soon as possible. I told him that the Atlantic had been crossed before by lone mariners, though their number was few, and the Captain then made the vow that was to make him world-famous.

"I shall cross the Atlantic THREE times, alone, and that will be a record that may stand for ever," he declared.

I saw a lot of the Captain after that. He was busily engaged in converting his little ship into a floating home, and when he brought the boat round from the yard where he had had the alterations carried out she was almost unrecognisable. The hold had vanished, the engine had been removed, and now there were two neat cabins in the boat, shining with white paint and varnish. Her hull was resplendent in a bright green coat, and her sails, white and new, flapped idly in the light summer breeze.

Then, one bright day in the autumn of 1938, Captain Clark strolled into the Y.M.C.A., where I and some of the other speed boat men were having lunch.

"I'm sailing to-day!" he murmured, absent-mindedly helping himself to my lunch, and that was all the news we had of his intentions. No fuss, no bother, just a casual "I'm sailing to-day!" We all went down to the quay and I towed the *"Girl Kathleen"* out into the main harbour channel, where the Captain set his sails, threw off the rope and slowly headed for the open sea.



Captain "Hurricane" Clark waves a greeting from the "Girl Kathleen," the Cornish lugger in which he crossed the Atlantic alone three times.

I had no further news of the Captain for many months. Then a brief note arrived to the effect that he had arrived at Savannah and had been arrested as a pirate because the authorities thought he had stolen the boat. He had been released and was now in New York. He hoped to be sailing back to England in a few days. Again silence as the months slipped by and June came. Then the scene changed to a tiny Cornish fishing village. The local worthies were standing upon the quay watching a battered little boat, her sails torn and ragged, enter the harbour. The boat came up smartly alongside the quay-wall, and an official stepped aboard and enquired for details.

"I'm Capt. Frank E. Clark of the *'Girl Kathleen,'* out of New York!" announced the bearded figure at the helm. The Captain had done his *second* crossing!

He stayed in Cornwall resting for several weeks, until once again the urge to travel came upon him. One morning in July we were preparing the speed boats for the day's work out on the beach, when the *"Girl Kathleen"* sailed into the Camber, the dauntless Captain waving proudly to the cheering boatmen. Later I sat in the tiny cabin that had been the home of Captain Clark for two months and 17 days of stormy sea on the homeward voyage. He told me that he had been running before a hurricane for some days when she had veered, the boom had snapped, as I had noticed, and the broken rigging had crushed him with cruel force against the cabin top as he leapt forward to try and save his gear. He was just able to struggle into the cabin and collapse into the bunk, where he lay semi-conscious for several days, his badly crushed ribs making breathing difficult. Thus he spent his 58th birthday, while the boat, unattended, drove before the storm. Later he managed to struggle back on deck and make good the damage.

August passed away very pleasantly. We were told of the plans that the Captain had made to sail in the autumn, but we did not think those plans would be carried out, as the war clouds were gathering. It was on 14th October that I saw him again. He came round to my house, and coming to the point, said he was sailing in the morning.

"What about the war?" I asked.

"I don't think anyone will hurt me, why should they?" he answered, and he was very confident that no harm would befall him. Knowing that nothing could change the mind of the stubborn old Captain we gathered on the quay next morning to say farewell to the *"Girl Kathleen"* and her gallant skipper. It was a nasty day. The rain was coming down in a solid sheet, while the sea was cold and misty, as we towed the boat out of the Camber, and watched in silence as Captain Clark shook out his sheets. Then slowly and, to us, sadly, the lugger drifted out to sea.

That was the last we saw of them—we always spoke of Captain Clark and his boat as "Them," as though the boat had a personality of her own. Later in the year we had given them up as lost, but we were being gloomy too soon, for at last there came a letter from the Captain: "Arrived at Porto Rico safely on the 22nd December. Heavy going, F.E.C." The Captain had done it again. For the third time he had made a lone voyage across the Atlantic, and somewhere in the West Indies, at the present moment, the *"Girl Kathleen"* is anchored in a peaceful bay while on deck a figure is sleeping peacefully and dreaming of his next voyage.

* * * *

The author of this article, **Mr. L. C. Pudney**, is a speed boat owner of Southsea. He is a friend of Captain Clark, and for a short time in the summer of 1939 took passengers out to visit the *"Girl Kathleen."*

Engineering News

Motor Torpedo Boats for the Royal Swedish Navy

The upper illustration on this page shows one of two 60-ft. motor torpedo boats of a new type built by Vosper Ltd., Portsmouth, to the designs of Lieut.-Commandr. Du Cane, for the Royal Swedish Navy. They are propelled by two Isotta-Fraschini main engines, each of 1,150 b.h.p. In addition they are provided with two Vosper V8 cruising engines, each capable of a continuous output of 75 h.p., which are arranged to drive the main shafts through special couplings. A cruising speed of from 8 to 9 knots can be maintained when using only the auxiliary engines.

The maximum contract speed was considerably exceeded on the official acceptance trials and the continuous cruising speed, with full load, is in excess of 40 knots.

Each boat is armed with torpedo tubes, which are fitted on each side of the wheelhouse, and provision is made for adequate anti-aircraft armament.

Electric Buoys in Canada

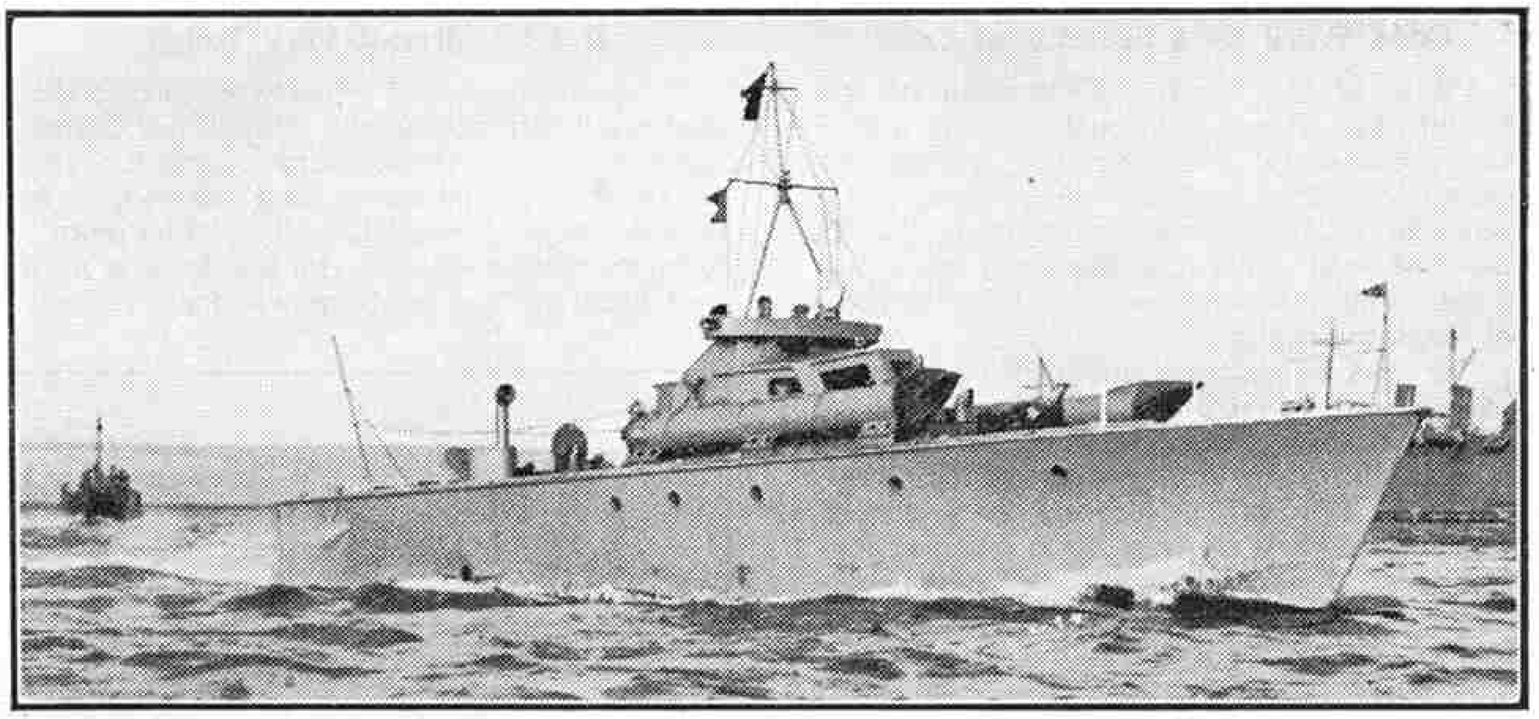
The first electric buoys to be used in Canada are now flashing their warning lights in the Lake St. Louis ship channel, Quebec, where 15 buoys of this type have replaced acetylene gas buoys, over which they are claimed to have several advantages. The electric buoys are only 4 ft. 6 in. in diameter, compared with 8 ft. for the gas buoys, and they weigh only 2 tons as against the 5 tons of the latter type.

A Year of War for the Life-boats

In the first year of war the life-boats round Great Britain and Ireland have been launched to the rescue 1,108 times and have rescued 2,300 lives. This is twice as many launches as in the first year of the last war, and nearly three times as many lives rescued. In the same period the Royal National Life-boat Institution has paid nearly £20,000 in rewards to its crews and launchers.

Canada's Largest Welded Tanker

A Canadian shipyard has recently launched the largest all-welded oil tanker ever built in the Dominion. She is the *"Lakeshell"* constructed for the Shell Oil Company of Canada, and measures 259 ft. in length, 43 ft. 10 in. in breadth, and 22 ft. in depth.



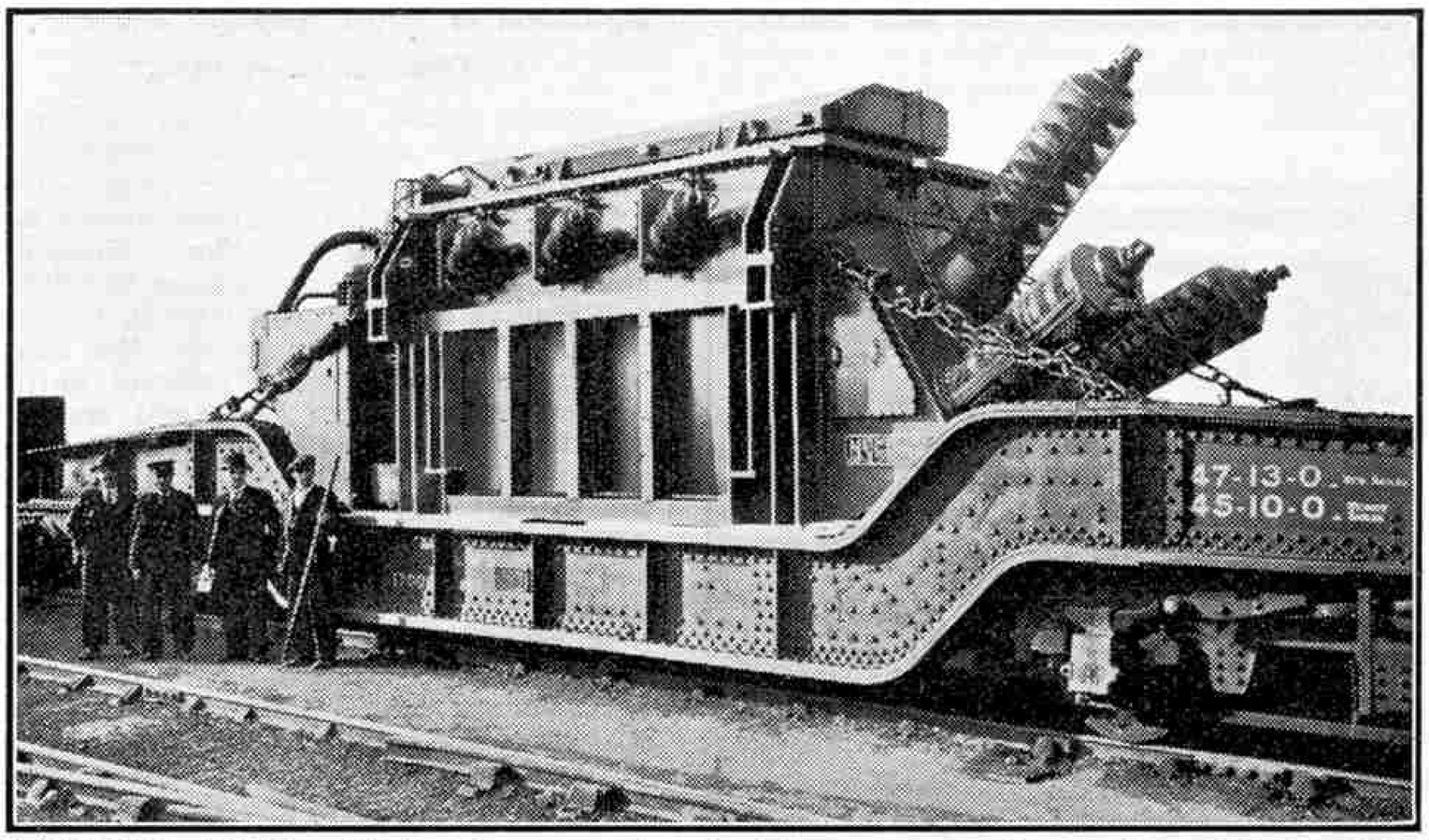
One of two 60 ft. motor torpedo boats built for the Royal Swedish Navy running on its auxiliary engines. Photograph by courtesy of Vosper Ltd., Portsmouth.

Wartime Protection of Panama Canal

Anti-submarine nets will protect the entrances of the Panama Canal. They are installed along the sides of the channel ready to be slung across in case of necessity. Anti-aircraft guns also have been installed at various points along the route and both ends of the canal have been mined.

* * * *

A new 17,700 tons aircraft carrier *"Wasp"* has been put into service in the United States Navy. The ship carries 75 aircraft and is armed with 40 anti-aircraft guns. It carries a crew of 1,000 officers and men excluding pilots.



A 30,000 kVA, 132 kV, mobile transformer specially designed for emergency use in connection with the Electricity Grid. Photograph by courtesy of Metropolitan-Vickers Electrical Co. Ltd., Manchester.

Mobile Transformers for Grid Service

The importance of maintaining supply throughout the Grid System of the Central Electricity Board is very great even in normal times and still greater under war conditions. Considerable attention has therefore been given to the problem of rapid replacement of apparatus which may from any cause become unserviceable. Among the vital units concerned are the large high voltage transformers installed at many points on the system, and spares for these have long been held available in different areas around the country.

The transport and installation of the ordinary service transformers involves difficulties and requires time, however, as these transformers are large and heavy, and their accessory equipment is bulky. It was therefore considered desirable to have available special spare transformers which, in case of emergency, could be connected up to the line and put into service immediately on arrival at site from the storage depot. For this purpose a large mobile transformer with a maximum continuous rating of 30,000 kVA was developed in the form of a self-contained unit, complete with all fittings and accessories attached, filled with oil and ready for service. The Metropolitan-Vickers Electrical Co. Ltd. have built five transformers of this size for the Central Electricity Board, and the lower illustration on this page shows one of them mounted on a rail truck ready for transport. The total weight of the transformer, complete with all its accessories and filled with oil, is 73 tons. It is shown mounted on an L.M.S. 80 ton low side-girder suspension type truck. The transformers were designed for either road or rail transport, and a number of suitable road trucks of capacity up to 120 tons are also available.

The transformers have forced oil circulation with air blast. The cooling fans and oil pumps are mounted on top of the cooler, just within the loading gauge. The transformer tank is provided with oil-conservator, explosion vent and other fittings usual with large transformers. The terminal bushings are set at an angle on the top of the front side of the tank, so that while giving the necessary electrical clearances they are just within the loading gauge.

* * * *

A new electrolytic process has been introduced in America for polishing stainless steel castings. It gives them a rich sheen and increased resistance to salt spray.

AIR NEWS

Good Work by a Searchlight Crew

Pilots of the Fighter Command of the Royal Air Force are enthusiastic about the good work done by the searchlight crews on the ground. One pilot who recently brought down a Junkers Ju 88 bomber said quite frankly that he could never have got his "bird" but for the aid of the searchlights.

"It was a beautiful moonlit night with little cloud when I got the Junkers," he said. "Suddenly, well ahead of me, a dozen searchlights shot slim pencils of light into the sky. For a few seconds they groped about, and then centred upon one particular spot. I looked hard, and then saw "Jerry," caught in the searchlight beams, looking for all the world like a silver moth. The searchlights continued to hold him, although he turned and twisted in an attempt to evade the inquisitive lines. He was a perfect target, and I closed for the fight. It was over very quickly. I gave two short bursts, hitting the Junkers with the second. He just went up in a blinding white flash, like a huge firework. I saw nothing further of the enemy, but when I landed I found various bits and pieces of the Junkers attached to my aircraft.

"The searchlights were first class. I take off my hat to them."

A Correction

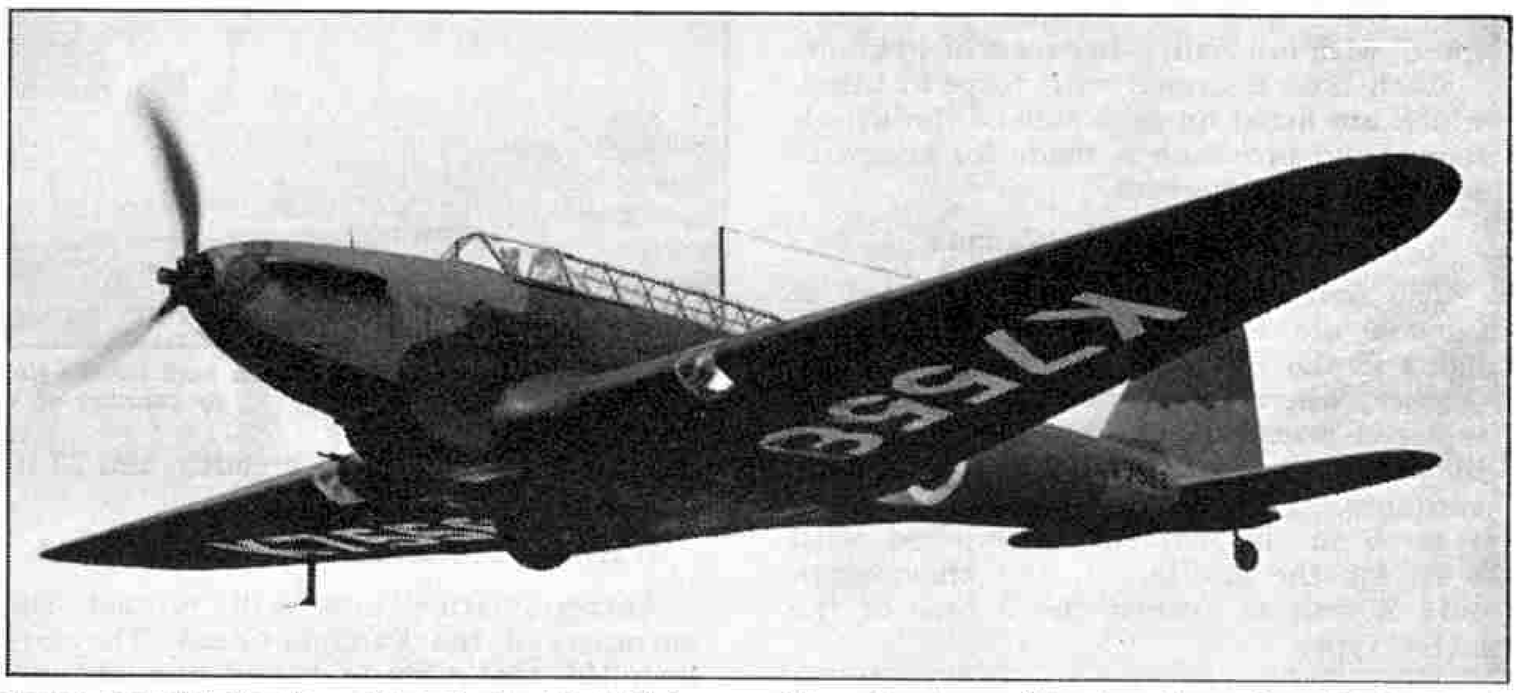
An unfortunate mistake occurred in the September "Air News," owing to a last-minute change of illustration. The effect was that a photograph of a "Hurricane" fighter was referred to as showing a "Spitfire." Many readers have written to point out this error.

* * * *

During the first year of the war R.A.F. fighters shot down 1,752 German aircraft.

R.A.F. Aircraft Very Tough

It has been proved repeatedly during the war that aircraft of the Royal Air Force possess an extraordinary capacity to withstand punishment and damage. A recent instance was that of a "Blenheim" bomber returning over the sea from a raid on Germany. The machine was forced down through bad weather conditions until, before the position could be retrieved, the nose had plunged into the waves. For a few moments the airscrew churned the water, and the air intake scooped up gallons. Then the machine bounced upward, both engines picked up again, and the pilot was able to fly it safely home, although the airscrews were bent, the tail wheel missing, the bomb hatch cover stove in, and the shield, cowlings, and air intake wrecked.



Fairey "Battle" Bomber. Although the "Battle" is one of the older types of bombers in service with the Royal Air Force, it gives a very good account of itself at every opportunity. Photograph by courtesy of "Flight."

Another striking example of the "toughness" of British aircraft was that of an Armstrong Whitworth "Whitley" bomber that was hit by anti-aircraft fire when over Bremen. One engine was put out of action and the other affected, and the damaged engine had to be nursed most carefully the whole way home. The greater part of this return journey was made at a height of only 400 ft. above the sea, but the pilot got his machine safely to a British aerodrome.

Similar successful homeward flights under conditions of damage which might be expected to bring any aircraft to earth have been made by "Wellington" and "Hampden" bombers. These experiences are a fine testimony to the skill of the workpeople who build the R.A.F. machines.

Training Pilots for Ferry Pool

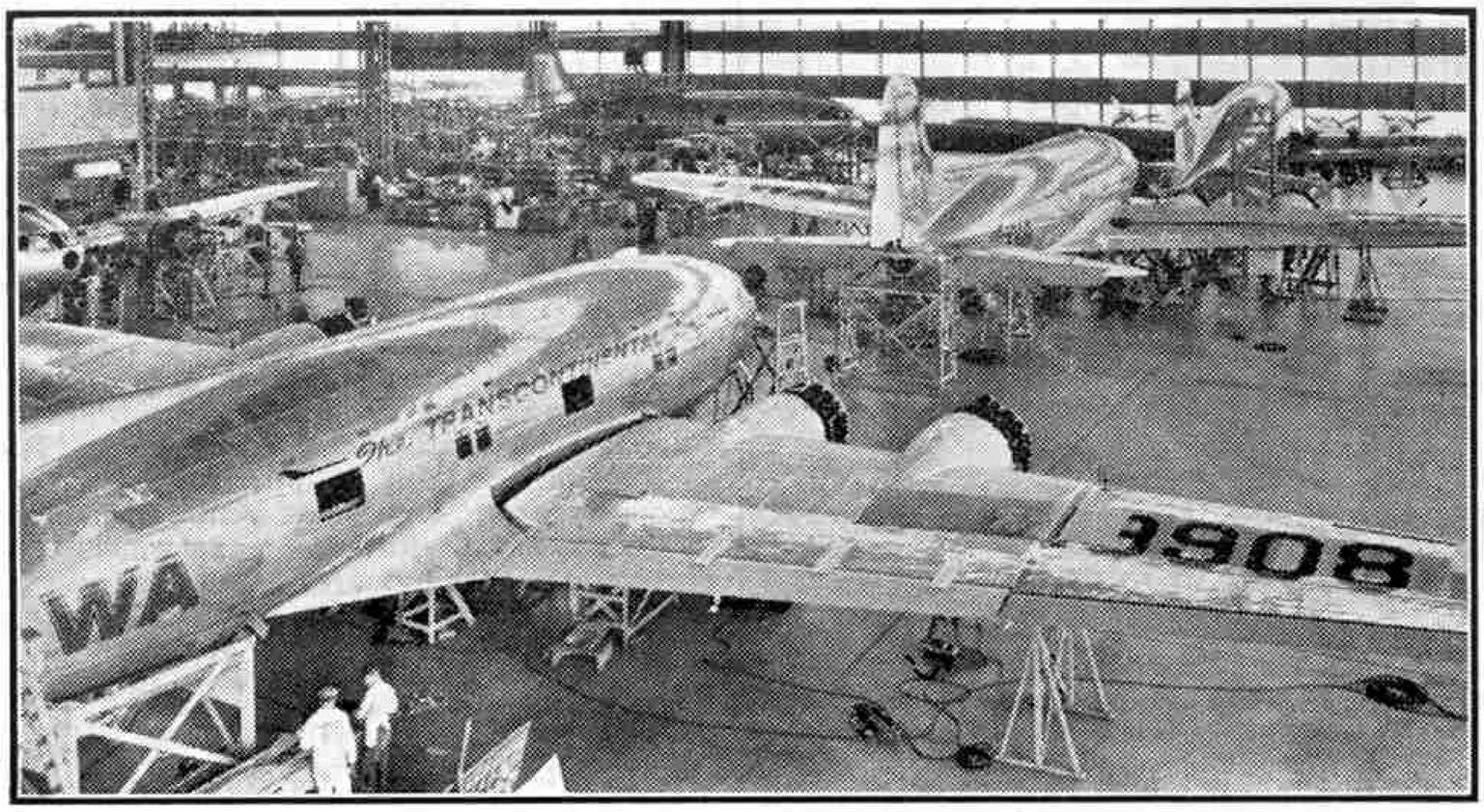
Several landplane pilots of the British Overseas Airways Corporation have been lent to the Air Transport Auxiliary to help in training pilots for the Ferry Pool. The B.O.A. men can be recalled whenever they are required for the Corporation's landplane services.

The Air Transport Auxiliary was started by British Airways Ltd. and its school is in charge of Mr. A. R. O. McMillan, who was formerly Chief Instructor and Navigating Officer of British Airways' school.

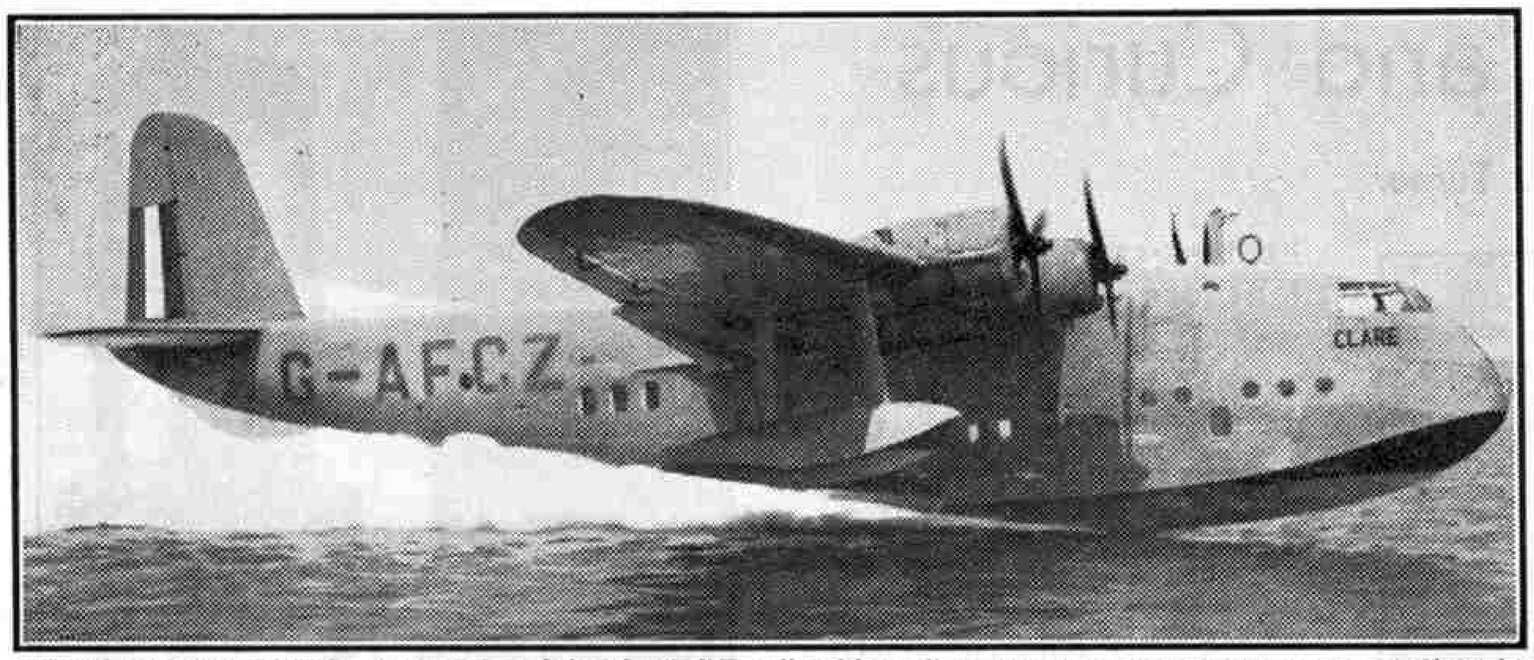
An Observer Corps "Bag"

Prompt action by an Observer Corps watcher on the north-east coast of England enabled R.A.F. "Spitfires" to bring down a German raiding bomber near enough for him to see the wreckage. One evening he spotted an aircraft flying at some 17,000 ft. and heading over the coast, and he decided that it was a Junkers Ju 88. The news was flashed through to the Observer centre, and so to a Fighter Command station. "Spitfires" were in the air within a few minutes. The enemy was quickly seen and overhauled, and the attack begun, and with their first bursts the "Spitfires" killed the German gunner. Then the Junkers was disabled.

A searchlight post some miles away observed the German bomber being harassed and forced down, and then saw it crash on the heather. Officers and men of the post were on the scene a few minutes later, and took prisoner the three live members of the German crew. The whole combat, from the spotting of the Ju 88 to its descent on the moors, had taken little more than 40 min. It was a proud member of the Observer Corps who visited the wreckage of the Junkers the following day.



A busy scene in the main assembly shop during the construction of Boeing 33-seater "Stratoliners." Photograph by courtesy of the Boeing Aircraft Company, U.S.A.



British Overseas Airways Corporation flying boat "Clare" taking-off at the start of her first westward flight in this year's transatlantic air service.

British Transatlantic Air Service Resumed

The upper photograph on this page shows the British Overseas Airways flying boat *"Clare,"* with which the British transatlantic air service between this country and New York was resumed on 3rd August last. The service is being operated over the now familiar northern route, by way of Foynes, in Eire, Botwood, in Newfoundland, and Montreal, Canada.

The *"Clare"* was commanded by Capt. J. C. Kelly Rogers, with a crew of four, who are shown in the lower photograph. On the first westward flight she took off from a port on the south coast of England and completed the 3,500-miles journey to La Guardia Airfield, New York, in 35 hr. 46 min. Stops were made at Foynes, Botwood, and Montreal, and the 1,990-miles Atlantic crossing took 16 hr. 6 min. On the return flight the ocean crossing was accomplished in 12 hr. 20 min. On both the outward and return trips the flying boat carried official passengers in addition to mail. Other crossings have since been made.

The *"Clare"* was originally named *"Australia"* and was intended for the trans-Tasman service between Australia and New Zealand, but it was taken over by British Overseas Airways Corporation on the outbreak of war. The *"Clyde"* also is to take part in the transatlantic flights this year. These aircraft are of the modified "C" class Empire flying boats, strengthened to have an all-up weight of 48,000 lb. By flight refuelling this weight can be increased to 53,000 lb., but this sytem is not being used in the present series of flights.

Record Traffic of Qantas Empire Airways

During the year ended 31st March last Qantas Empire Airways carried a total of 5,417 passengers on the flying boat section of their air routes, as compared with 3,024 during the previous year, and there was no accident to passengers or staff. The record of punctuality over the Sidney-Singapore section was remarkably good, and only 21 services out of 256 arrived a day or more late, giving a terminal punctuality as high as 91.8 per cent.

R.A.F. Fighter Markings

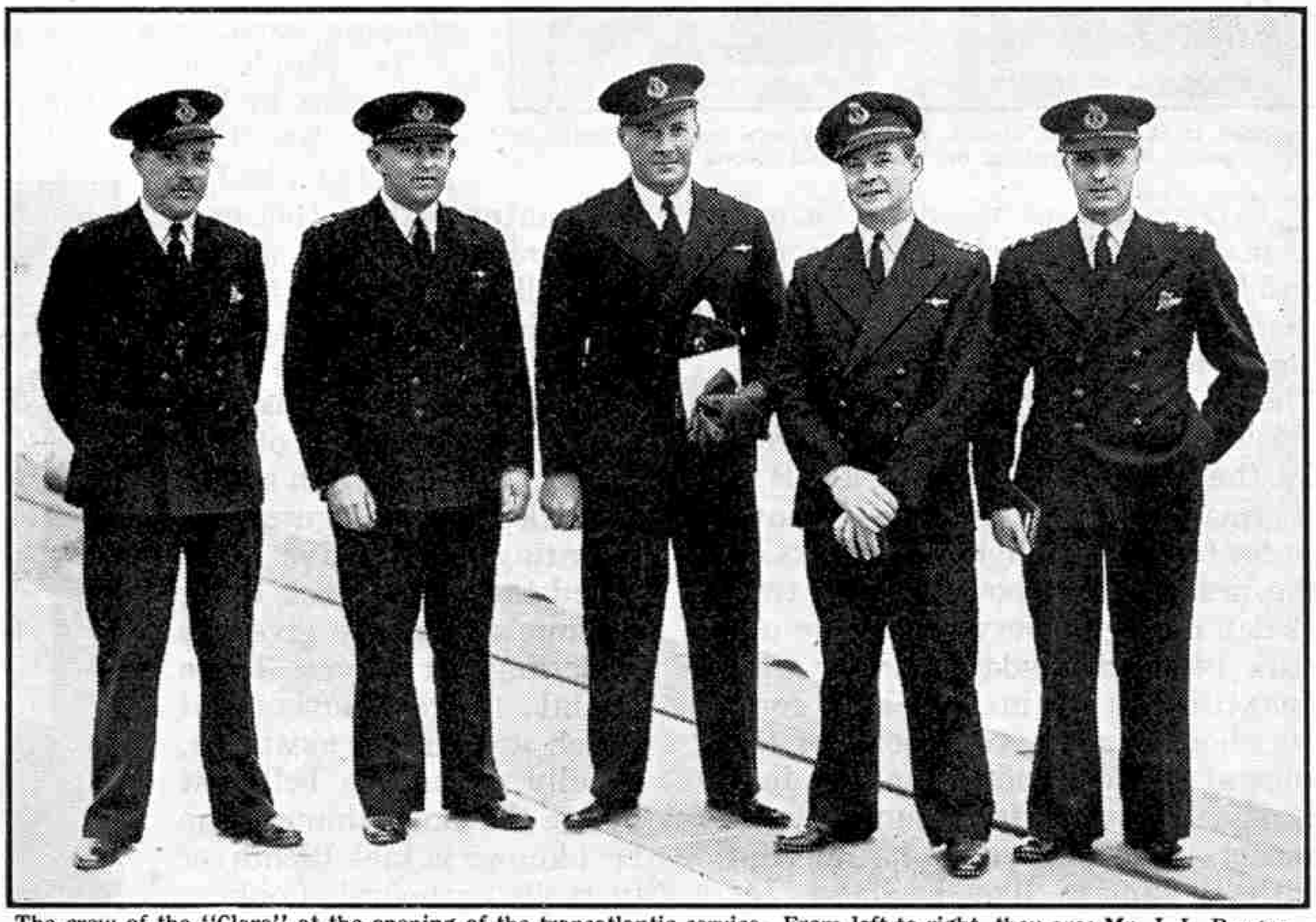
British fighter aircraft in flight have been identifiable by the familiar black and white finish of the underside, black under the port wing and white under the starboard one. A new colour scheme is now being used, in which the whole of the undersurface of the aircraft is finished light blue, apparently to tone with the sky.

R.A.F. aircraft now have vertical red, white and blue stripes on the fin.

New American Aircraft for the R.A.F.

Several types of American aircraft are now being delivered in quantities to the Royal Air Force. Two of these types were inspected recently by the Duke of Kent, who is a Group Captain in the R.A.F. They were the Douglas DB-7 twin-engined light bomber, which in the R.A.F. will be known as the "Boston," and the Brewster Navy Fighter, which will be called the "Buffalo" and be used by the Fleet Air Arm. A photograph of the Douglas machine was reproduced in the November 1939 *"Air News"* pages.

Another Douglas type now being delivered to the R.A.F. is the B-18A twin-engined bomber, which in the Service will be known as the "Digby." It is used by the U.S. Army Air Corps, and is being supplied to the Royal Canadian Air Force.



The crew of the "Clare" at the opening of the transatlantic service. From left to right, they are: Mr. J. L. Burgess, 2nd radio officer; Capt. E. Rotherham, 2nd capt.; Capt. J. C. Kelly Rogers, Commander; Capt. E. R. B. White, navigator; and Mr. C. E. Wilkinson, 1st radio officer.

It is reported that Britain has ordered 800 of the new Lockheed P-38 twin-engined fighters. This has Allison type liquid-cooled engines, and is very fast, the top speed being 404 m.p.h. at 16,000 ft. It can climb to that height in 5.6 min. The P.38 is armed with four machine guns and a 23 mm. cannon.

Stalking an Enemy Convoy

A pilot of the R.A.F. Coastal Command took a German convoy in Scandinavian waters completely by surprise with a particularly audacious attack. He first sighted it in clear, cloudless weather, and stalked it carefully until he could find cloud cover for his approach. Then, emerging, he dropped a line of bombs across the ships, and raced for cover again. The pilot then made a wide circuit in the clouds, came out of them from an unexpected direction, and diving almost to sea-level he thoroughly machine-gunned the cabin of the nearest German ship before zooming up again to the shelter of the clouds.

The convoy was escorted by heavily-armed German warships which were so completely taken by surprise that they did not fire a single shot at the British machine.

Polishing a Qantas Empire Flying Boat

Cleaning the hull, wings, and floats of the 18-ton Empire flying boats of Qantas Empire Airways is done at Rose Bay, and is accomplished by first hosing down with fresh water to dissolve the salt, and then applying a protective coating of a transparent paste preparation. There are about 250 sq. yd. of surface in the hull alone, and it takes 50 man hr. of labour to get the spotless finish to the sleek surface of the boat. By the time the flying boat reaches England the cleaning process has to be repeated to renew the protective film.

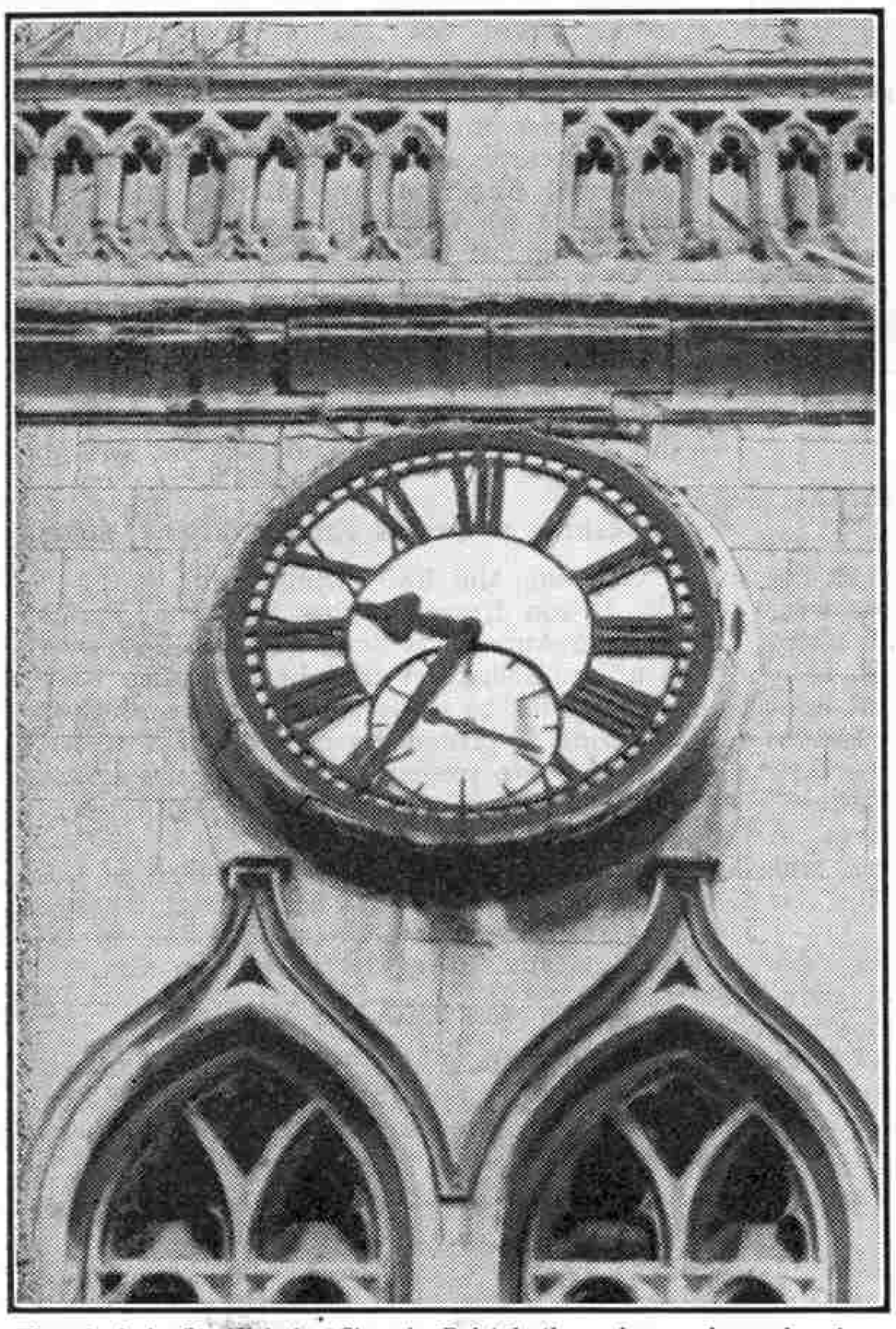
On With the Meal!

A Sergeant pilot billeted in a Scottish town close to his station was sitting down to mid-day dinner one day when he was recalled to duty. An enemy bomber had been sighted. The landlady was sympathetic. "Never mind," she said, "I'll keep your dinner for you."

"Don't bother," he said jokingly, "I'll be back before it has time to get cold." He was. The enemy machine was disposed of in less than 10 min.

Clocks Quaint and Curious

By M. Lovett Turner



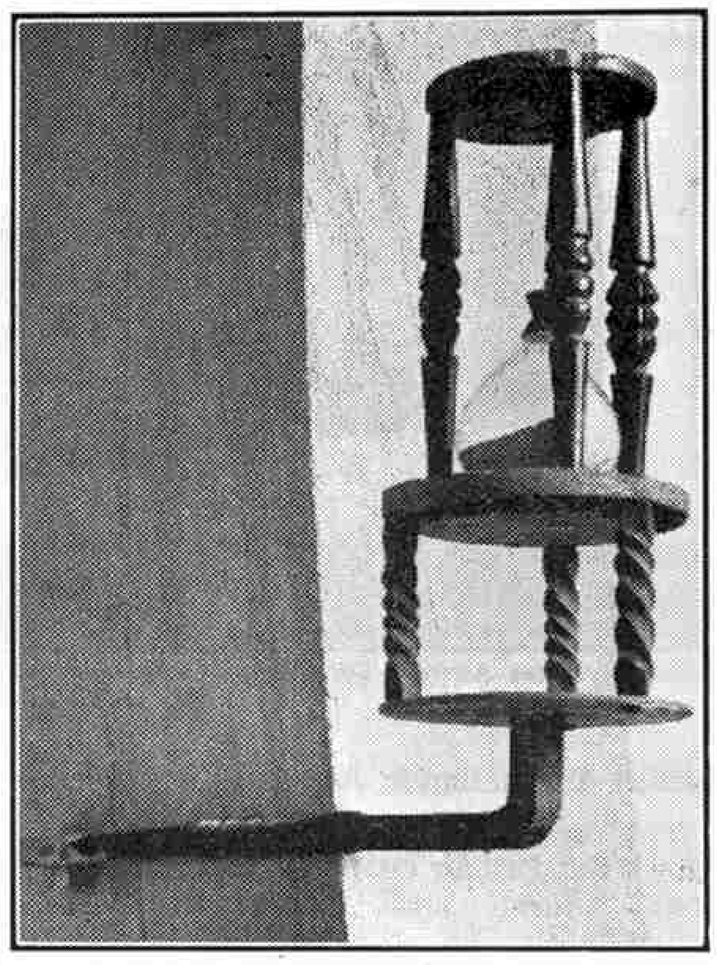
The clock in St. Nicholas Church, Bristol, the only one in a church or public building which has an external second hand.

FROM the days when prehistoric man placed a stick in the ground and told his wife to waken him when the shadow fell on his face, man has been increasingly time-conscious. The earliest known time-piece still in existence is an alabaster bowl made by the Egyptians about 1,400 B.C. A small hole at the base allows water to pass through, and marks on the inside of the bowl tell the time of day or night, very much like our milk bowls of to-day marked with quantities on the inside. Slight complications must have arisen, for the ancient world divided the day into 12 equal portions from sunrise until sunset—quite cheering for a land with a climate like England, for hours would be shorter in winter than in summer! It was not until mechanical clocks were invented in the 14th century that time was reckoned from noon to midnight.

As time increased in value, attempts were made to harness it. King Alfred, to whom credit must be given for more than burning his hostess' cakes, invented a lanthorn of horn in which was placed a lighted candle with clearly marked divisions. As the candle burned, so did time pass. A decided improvement on the sundials, or shadow clocks, which only told the truth when the sun was shining.

As it was impossible to have marked candles burning all over the village or town, slaves were kept on the top of the watch-tower with a bowl of water or an hour-glass of sand. At certain intervals it was their duty to strike a bell and call the time of day. Later, when clocks were more general, the town crier or night watchman called the hours and the state of the weather during the hours of darkness, in tones that could not have been pleasant for the sleeping population!

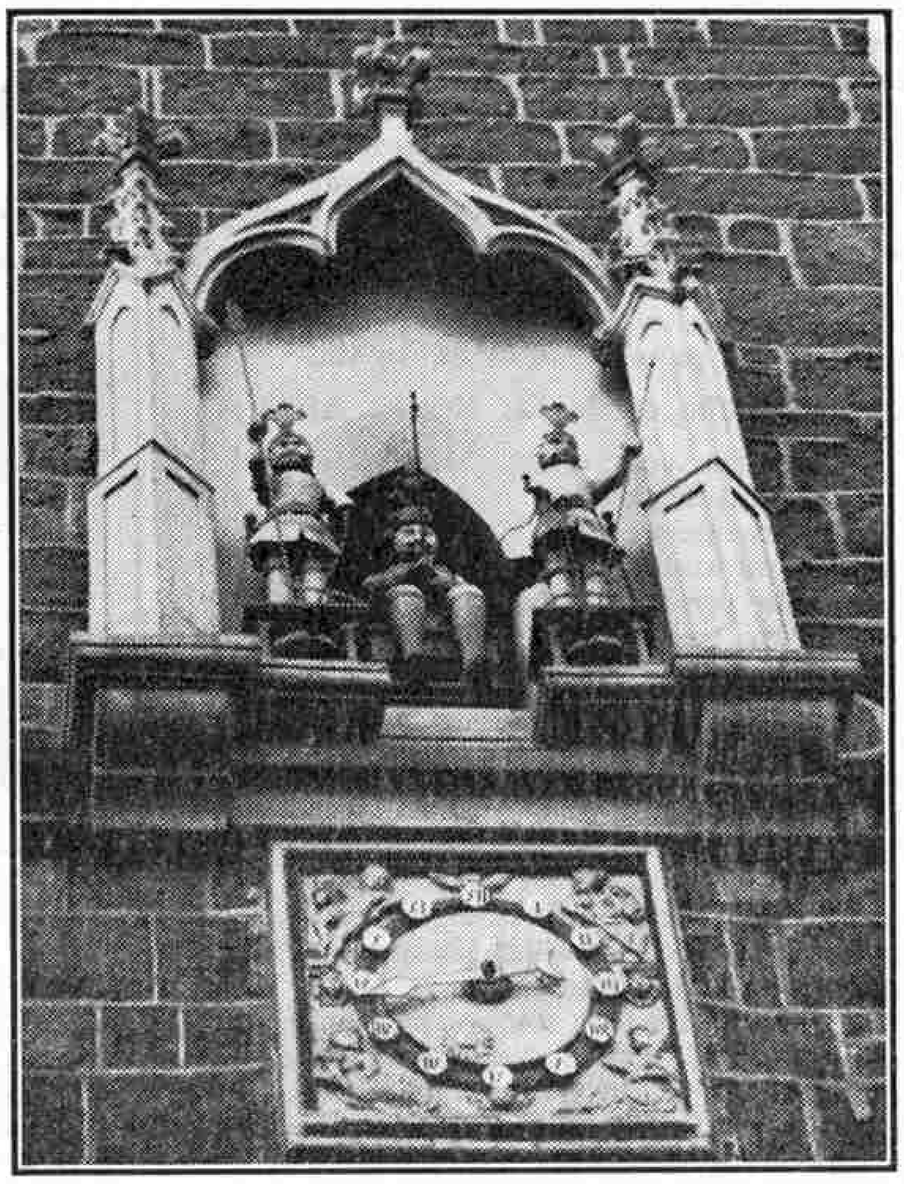
As people were accustomed to be told the time by the sound of a bell, it was natural that the first mechanical clocks should also tell the hours by a bell. Even in mediæval days innovations were looked upon with a doubt, so to disguise the unusual aspect of the clock the maker often added a clock-jack, or figure representing the slave who tolled the hours, Jack being a name commonly given to underlings or slaves. These quaint figures, several of which are still in existence, usually strike the bell just before the clock chimes. The best known is Jack Blendiver in Wells Cathedral. Looking as unlike a slave as possible with his painted moustache and curly hair, this elegant patriarch strikes two bells with his feet and a larger one every quarter with a hammer. He sits in a queer little watch box all on his own, but his energy is a signal for the



The preacher's hour glass to guard against long sermons!

tournament to start when the hour chimes. These figures are attached to the famous clock made by Peter Lightfoot, a monk at Glastonbury Abbey, in the 14th century.

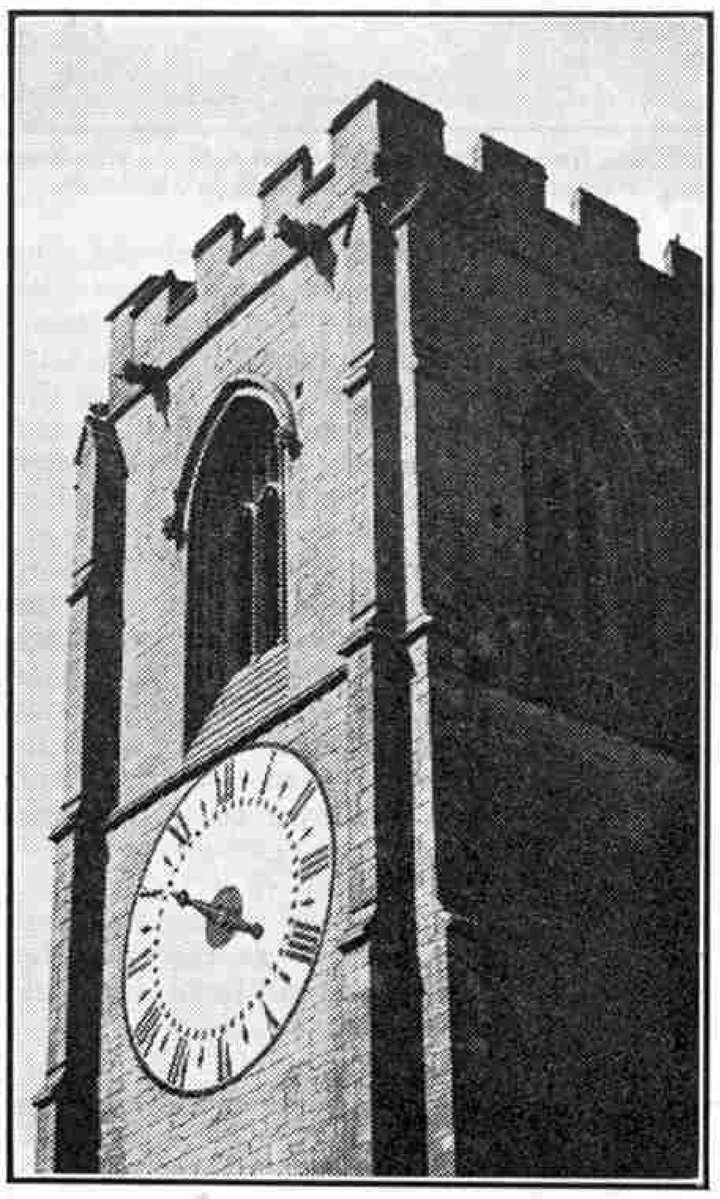
A similar clock, though several centuries later in date, is on the Church of St. Mary's Steps, at Exeter. The clock has only one hand. Three figures stand in military guise above the dial. Although known locally as Matthew the Miller with his two sons, the central figure is of royal birth, for he represents Henry VIII. With a kingly gesture he leans



The clock at St. Mary's Steps Church, Exeter, Devon. The central figure above the dial represents Henry VIII.

forward and strikes the hour, while the men-at-arms strike the quarters on bells placed under the platforms.

The works of the early clocks were made entirely of iron. A horizontal bar, pivoted at the centre, was pushed backward and forward by a crude form of escapement driven by a weight. The face, or dial, was a marvel of complicated signs and symbols. Often the Earth was the centre round which Sun, Moon and stars revolved in due season. Hours, weeks, months, tides and the different phases of the Moon were all given their allotted places, as well as ecclesiastical events of importance. A celebrated clock at Beauvais adds a dramatic in-

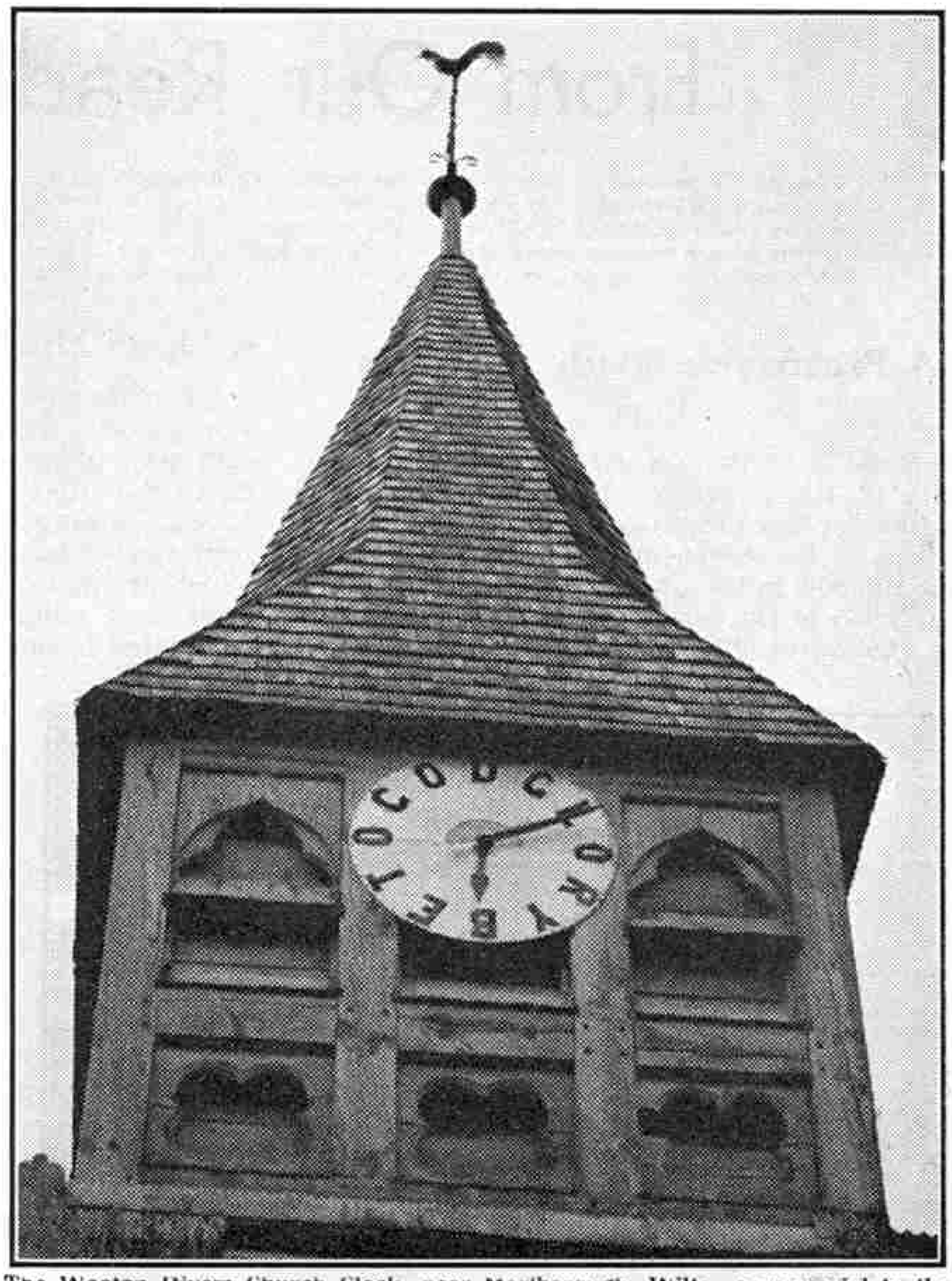


The single-handed clock at Coningsby Church, Lincs.

terpretation of the Judgment day with a cock crowing, angels blowing trumpets, red flames, serpents and Virtue as characters. St. Michael with his scales looks favourably on Virtue, while little red devils throw Vice into Hell to the accompaniment of a realistic clap of thunder.

As the church has always been the centre of village life, it was natural for the clock to be placed in a prominent position on the tower. Scratch dials are often found on the walls of churches, but they were not in the strictest sense sundials, for they usually told only the times for certain services or mass. The nine o'clock mass and vespers in the afternoon are generally the most clearly marked lines to be seen.

Although many think that anything less than 500 years old is not worth noticing, there are many later day clocks up and down the country that are well worth finding. Like that at St. Margaret's, Westminster, the clock at Coningsby, Lincolnshire, has only one hand; while, as a contrast, that on St. Nicholas Church, Bristol, has both large and small hands and a second hand as well! This is probably unique. This clock also has the heaviest weight in the world, weighing 10½ cwt. Winding takes 10 minutes and has to be done weekly. Curfew has been rung from the tower for 800 years, long before the clock came into being.



The Wooton Rivers Church Clock, near Marlborough, Wilts., a memorial to the Coronation of King George V.

Two other clocks worthy of mention are those at Wooton Rivers, near Marlborough, Wiltshire. They were both made by Mr. Spratt, who earned the local name of the "Clock Man." The one on his cottage ingeniously tells both the time and its name. The church clock has a charming little history attached to its construction. It is made from materials given by the villagers to celebrate the Coronation of King George V. Reaping, mowing and threshing machines, a chaff cutter, bicycles, bedsteads, fire irons, saws, brass weights, taps and gas pipes, provided contribution; and, to bring the homely housewife into the scheme, a broom handle serves as a pendulum for this truly democratic clock. Mr. Spratt himself moulded this heterogenous collection of unlikely implements together with a foot lathe and the kitchen fire.

"Glory be to God" are the letters telling the hours, and the five bells are arranged so that the strike is varied for every quarter of an hour through the day. Rather a life-long task to learn to tell the time by ear, and not by sight, in the village of Wooton Rivers.

London, as might be expected, provides many examples of queer and unusual clocks. There is even one that has no dial. When Sir Christopher Wren was building the church of St. Vedest in Foster Lane, he deliberately omitted the clock face, in order to avoid spoiling the appearance of the tower. The hour is announced by the bell only.

Benjamin Vulliamy, Queen Victoria's clockmaker, made the present St. James's clock, and the equally well-known one at the Horse Guards in Whitehall. The latter clock has a distinction of an unusual and doubtful nature—its bells are out of tune! Vulliamy also repaired the celebrated old clock at Hampton Court Palace, which was made for Henry VIII, exactly 400 years ago. This clock gives not only the hour, but also the day of the week, the phases of the Moon and the position of the Sun in its orbit. This is another example of the custom in olden times of making large clocks do duty as almanacs in addition to their normal functions.

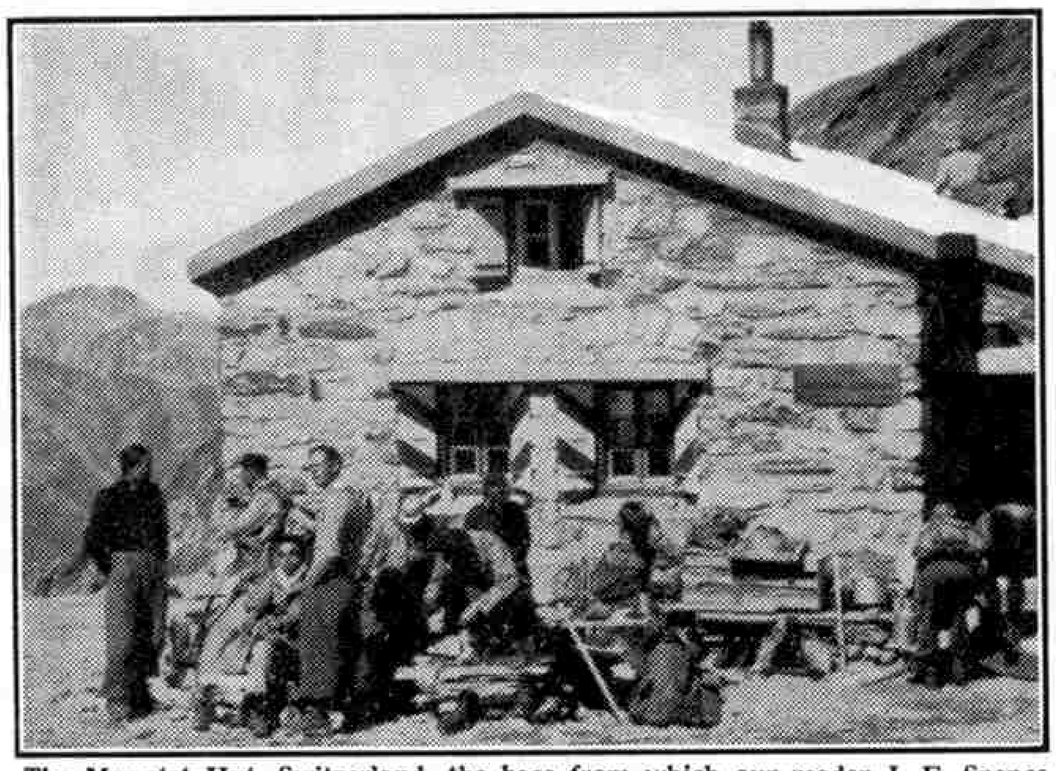
Known to all newspaper folk are the famous "Giants," a pair of clock-jacks in Fleet Street, made in 1671 for the original church of St. Dunstans-in-the-West.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A Progressive South American Port

Rosario is the second most important city of the Argentine Republic. It is an outlet for the products of the great fertile plains of the Argentine, and although it is nearly 300 miles up the Parana River it probably is the largest grain shipping port in the world. The most important cereals



The Mountet Hut, Switzerland, the base from which our reader J. E. Spence made the climb of Lo Besso described on this page.

shipped from it are wheat, maize, and linseed, but these are not the only ones.

There are many important grain elevators in the port. Loading into ships is carried on by means of conveyors. Owing to the bumper wheat crop last year the elevators were filled to overflowing, and many thousands of tons of grain were stored in bags in immense piles that were covered with tarpaulins. The illustration at the foot of the page shows a portable conveyor in use in making one of these piles.

The port was made by building a wall about 100 yds. away from the cliff, and the intervening space was filled in with sand taken from the river bed by dredgers. The city itself is modern, with good streets and many paved roads leading outward to different parts of the country. There are excellent tram and bus services, which are claimed to be the cheapest in the world; and among the vehicles used are Diesel-engined buses imported from England. Fishing on the Parana River is a great sport, a fish known as the dorado being particularly good to catch.

C. T. Godward (Rosario, Argentina).

Reindeer and Cricket

While being conducted through the factory of a Lancashire sporting goods firm recently I noticed a bat-maker using a curious finishing tool in the manner shown in the illustration at the top of this page. I enquired what the tool was, and it turned out to be the shin bone of a reindeer! Nothing gives a bat a finer finish than polishing with such a bone.

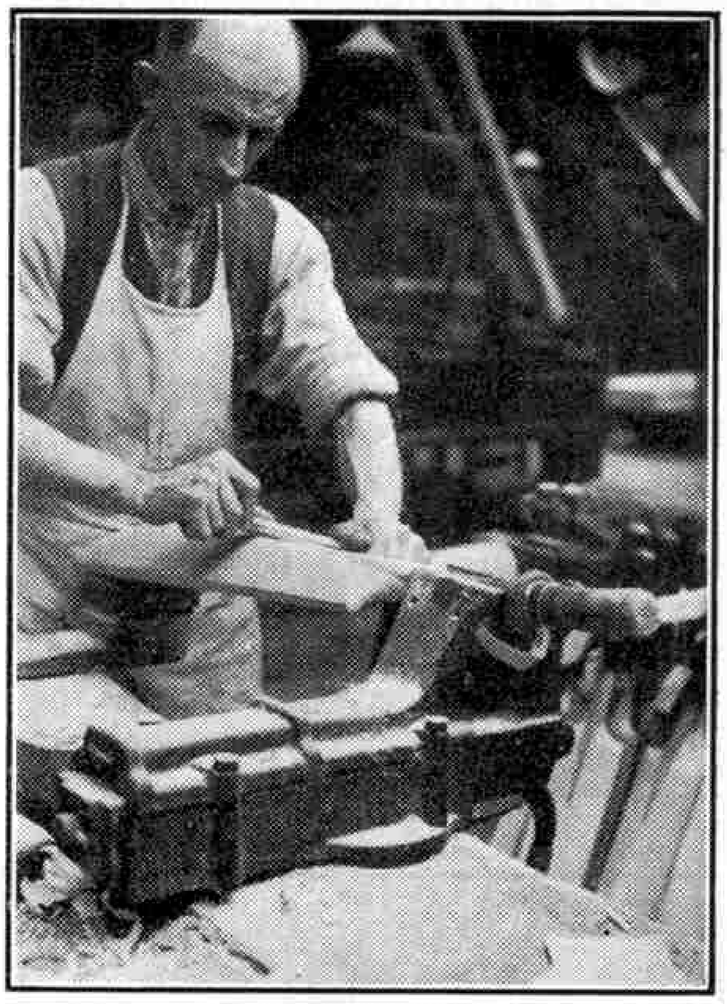
G. B. Wood (Leeds).

A Mountain Climb in Switzerland

Never before have I enjoyed a holiday so much as I did a stay in Switzerland last summer, and there is one experience in particular that remains in my memory. It was raining when three of us set out from the Swiss village of Zinal to climb the 13,500-ft. mountain Lo Besso. It was to be a long climb; too long by far to be com leted in one day, so we were to sleep that night at the Mountet Hut up in the mountains, and to climb Lo Besso and return to Zinal next day.

The walk to the hut was long and tiring, up by a glacier, and it was getting dark as we arrived at the hut door, where we were welcomed by the old guardian. The hut was small, with a sleeping room fitted with a long bench and blankets for each sleeper. Downstairs there was a small room in which were a stove and wooden tables and benches, and there we ate a hot meal when we had discarded our rain-soaked clothes. As there is little to do in a climbing hut, we turned in after our meal, but not before going outside to look at the weather. Our luck was in, for it had cleared and the Moon was lighting up the amphitheatre of huge mountains surrounding us.

I awoke to find a beautiful day awaiting us, with fresh snow lying on the ground, and by six o'clock we were off. The walk

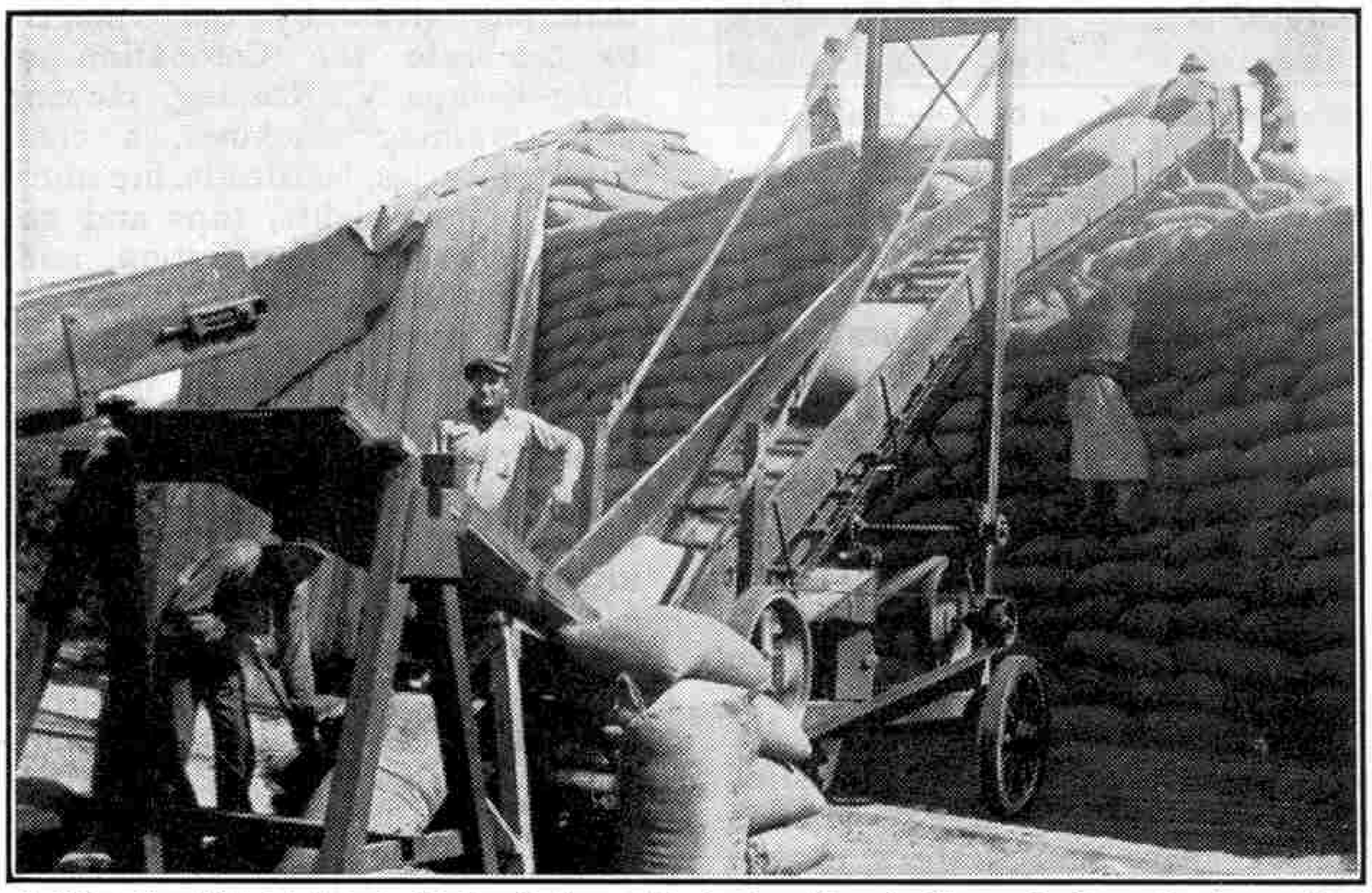


Polishing the surface of a cricket bat with the shin bone of a reindeer. Photograph by G. B. Wood, Leeds.

to the foot of the actual mountain was over snow and when we reached the rock we left our ice axes. We were already roped, and started climbing immediately. The cracks were full of snow, making the work difficult and slow. We kept to the ridge of the mountain, and it was three o'clock in the afternoon before we reached the summit.

We had very little time to spare there admiring the magnificent view, and the descent was a race against time, for a sea of swirling mist was surging up around us as we hurried on our way. We found our ice axes and there followed a long glissade, or slide down the snow to the hut. From the hut we sped on down to the glacier, which it was necessary to cross to get back to Zinal. Then our luck deserted us, for when it became dark we discovered that we had left our lantern at the Mountet Hut, and we had to stay out until daylight.

J. E. Spence (Newcastle).

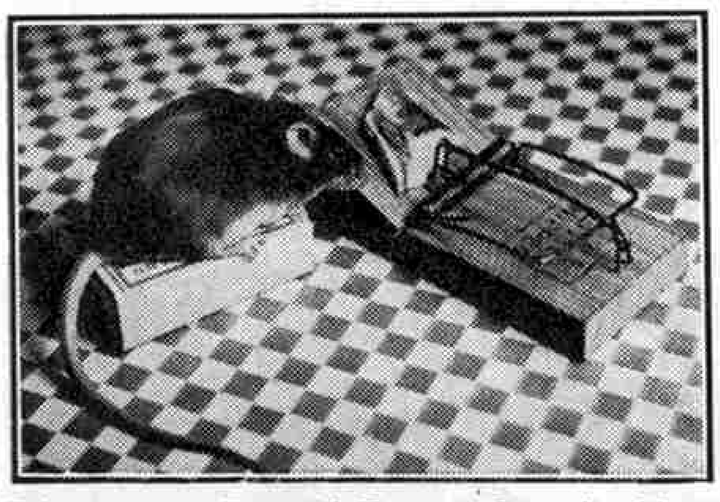


Building piles of filled grain bags with the aid of a portable elevator at Rosario. Thousands of tons of grain were stored in this manner last year, when there was a bumper wheat crop in Argentina. Photograph by C. T. Godward, Rosario.

Photography

How the Mouse got the Cheese

By L. Cryer

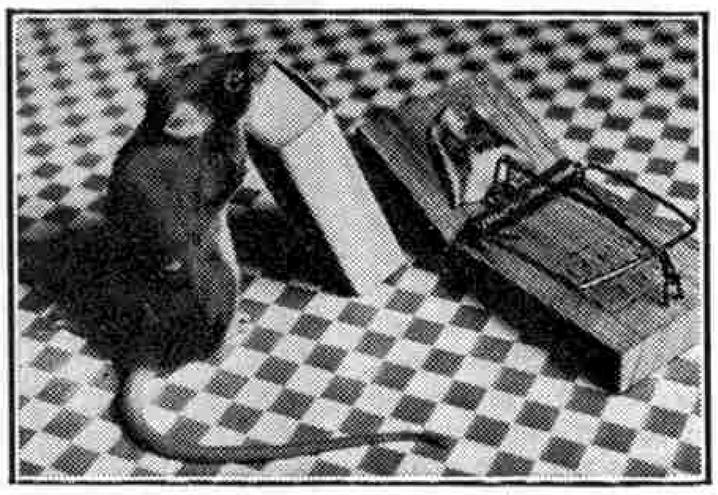


This cheese smells good! How can I get it without being caught?

PHOTOGRAPHY being a comparatively new form of art, it is not surprising that developments in this direction are continually being evolved. The latest type of artistic picture is often obtained with miniature models arranged on a table with a suitable background. Charming effects can be obtained with glass models of humans or animals if some original scheme of lighting them is employed, but the tendency to use living animals is now creeping in, the idea probably having been encouraged by the success of the animated film cartoons so popular on the screen nowadays. In these films animals usually play an important part, and although they are of course only drawings, one famous studio at least always takes its models from actual living animals.

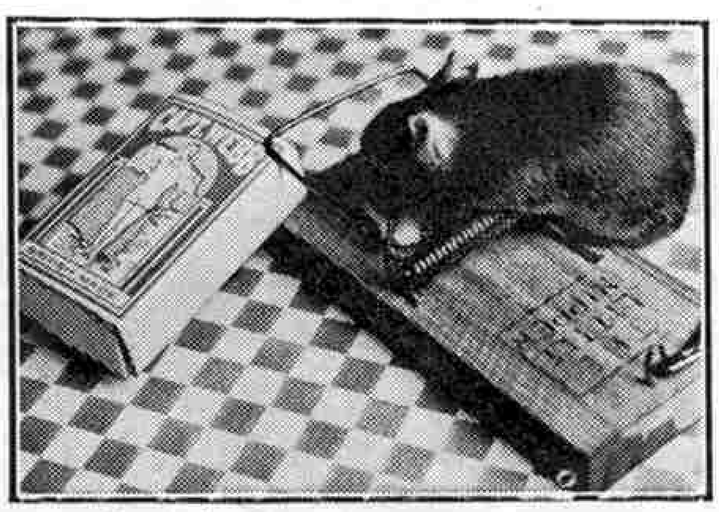
For several years I have been using animals that I keep as pets for my photographic work. I find hedgehogs are the most successful "models," as they are quite easy to tame in captivity, and soon learn not to roll up in a ball at your approach. Recently I introduced a few mice into my menagerie, and although they were very wild and timid at first, I was soon able to make use of them for a series of "strip" photographs. My most successful story I have entitled "How the Mouse Got the Cheese." I will tell you how this series of five pictures was obtained.

As mice are notoriously nervous animals, speed was the first essential in this work, and so the strongest possible lighting effects were arranged. The table was moved beneath a window facing north, and two flood



This match-box might help.

lamps were trained on to the mouse-trap. The camera, an F/2.8 Reflex Korelle No. 1A, was then erected on a tripod close to the table, and with the lens opened as wide as possible the trap was carefully brought into focus. In this way it was possible to obtain an almost instantaneous "snap" at the critical moment when the mouse was in the exact position

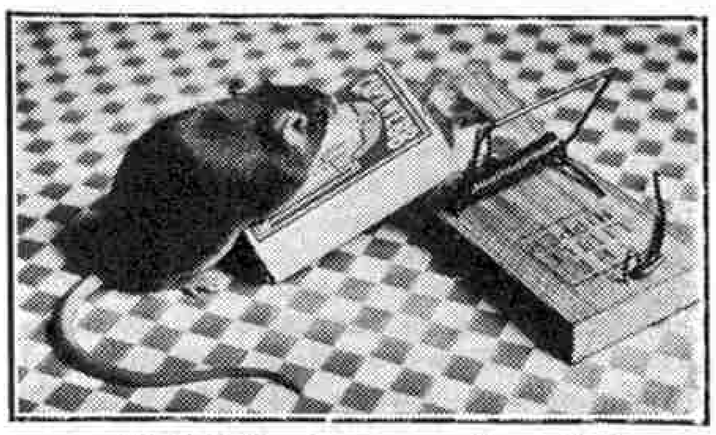


Caught it alright. Now for the cheese!

required for each picture in the story. Of course if I had been employing an animal that had more lethargic movements, such as one of my tame hedgehogs, a smaller stop could have been used, and a greater depth of focus would have resulted; but speed would have been lost as a longer exposure must be given to produce the negative of correct density. With a mouse as my model I could not risk this, so I took a great many "shots" during the course of making my photo-story, and by piecing them together, throwing out pictures where the mouse was not absolutely sharp, I eventually got what I wanted.

The first picture in my series is a perfectly natural one, and shows the mouse sitting on the match-box wondering how it can get at the cheese without being caught. The second picture was perhaps the most difficult of all to obtain. I had to give the impression that the mouse apparently had an idea; it would move the match-box so that this would catch the spring, instead of being caught itself!

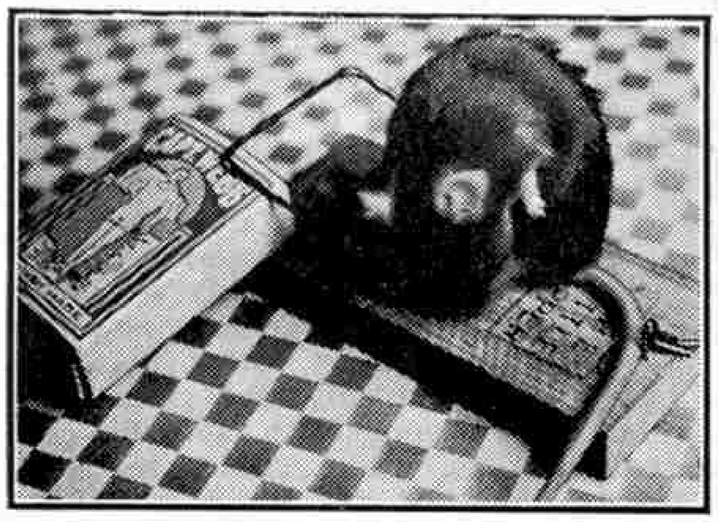
The next picture was simple, as although the spring appears to be caught in mid-air, it is actually held in position by a black tin tack, which can just be seen on the left side of the trap. I found that this



That's better. Here comes the spring!

"faking" was the only way possible to obtain the complete story, otherwise the mouse might have met its fate in the usual manner. In the fourth picture the tin tack has been removed, and the spring allowed to trap the match-box. The mouse can now start on its meal of cheese in safety. The last picture is also a natural one—a wash and brush up after the meal.

I hope readers will be tempted to try their hands at table-top photography with living models, and in order to encourage their efforts in this direction I offer five prizes of £2/2/–; £1/10/–; £1/1/–; 15/– and 10/6 respectively for the best series of five pictures forming a photo-story. Envelopes containing entries should be posted to *"Living Models Photographic Contest,"* Meccano Ltd., Binns Road, Liverpool 13, and should reach me on or before 30th November.



Thanks very much. Here goes for a wash and brush up.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"The Wonder Book of Soldiers"

Edited by HARRY GOLDING. (Ward Lock. 6/- net)

The Wonder Books issued by this well-known firm form a splendid series of illustrated volumes on topics of all kinds, from daring deeds, science and inventions, to things to do and the keeping of pets. The "Wonder Book of Soldiers" is fully up to the high standard that other volumes in the series have set, and this ninth edition is a remarkably complete survey of the modern British Army in peace and war. At a time like this every boy will revel in its contents, which cover every phase of Army life, including the activities of the Forces in the Great Dominions, India and the Colonies. Its value is increased by a wealth of splendid illustrations, consisting of eight colour plates and more than 300 drawings and reproductions of actual photographs.

We begin with a general survey of the British Army in peace and in war, after which we have an account of military uniforms and badges of rank, excellent drawings of which will enable readers to recognise the rank of officers and non-commissioned officers. Then we come to Army life itself, follow the soldier as he finds his footing on entering, see how he learns to shoot, and watch him on the manœuvres that train him for active service.

This leads naturally to modern warfare and to the development of the mechanised forces that play such a great part to-day. Artillery, Cavalry, and Engineers receive special attention and signalling is admirably dealt with.

The sporting side of Army life is another topic that receives its share of attention, and then follows sections dealing with Dominion and Indian Armies, with the forces of the Colonies, and with such matters as honours and rewards, colours and regimental badges. We see also how troops are moved up to the front and how they live during actual warfare. The book ends with an excellent review of the war of 1914-18 and the early days of the present war.

We can thoroughly recommend this excellent book to every reader of the *"M.M."* who wishes to know something of our Armies and of the tasks that face them.

"Treasure Valley"

By L. PATRICK GREENE
(Harrap. 5/- net)

Here is another fine Rhodesian story from Mr. Greene. His heroes are Dirk Harding and his cousin Tom from England, who set out with a famous big game hunter to seek jewels and gold buried by Portuguese centuries earlier. A rascally Dutch farmer learns their secret, and there is a desperate race for the treasure between the two parties. Fierce encounters take place between them, and attacks by leopards and a fight with rebellious natives add to the excitement, but the boys eventually win their treasure.

"Trooper Takes Command"

By L. PATRICK GREENE. (Harrap. 5/- net)

Once more Mr. Greene gives us one of his now famous Trooper Useless stories. In it we meet that hero, whose real name is Ouless, immediately after his return to Rhodesia, with other members of the British South Africa Police, from coronation duty in London. He chooses to serve at Headquarters for a time instead of at a post, chiefly because his native servant is in prison and he has decided to wait for his release. He is given a hard time, but this is all part of the training, and at length Useless is sent to take over an outpost that has been neglected. There he is in his element. He cleans up the camp, puts new life into the native policemen, and administers justice among the natives with his usual homely wisdom. Encounters with witch-doctors, crocodiles and lions enliven the story, and there is a particularly interesting incident in which Useless learns something of the cunning of the baboon. In the end our hero is astonished to find that his good work has brought him promotion.

As with other Trooper Useless stories, there is abounding interest and excitement, and the practical knowledge that the author possesses of police work in Rhodesia, is evident everywhere, giving his book the authentic ring. The illustrations consist of a coloured frontispiece and four full-page drawings.

Rough going for a medium and a light tank. This illustration and the one below are from "The Wonder Book of Soldiers," reviewed on this page.

A portable wireless set in operation by the roadside.

"'Galleons of the Air' and Other Flying Yarns"

By ERROLL COLLINS

"That Girl Ginger"

By DORA OLIVE THOMPSON
(Lutterworth Press. 8d. net each)

These two volumes are included in the first issue of Wren Books, a new series of cheap modern pocket books.

A well-planned story of the air, full of excitement and at the same time realistic, forms the title story of Mr. Collins' booklet, and is one that will be thoroughly enjoyed. The hero is summoned to fly a strange passenger, who is revealed as the leader of a band of air pirates. The aeroplane crashes in the sea, and the hero falls into the hands of the pirates, who are planning a daring raid on British treasure flying boats. These evil schemes are thwarted in a most satisfactory manner, which the reader must be left to discover for himself.

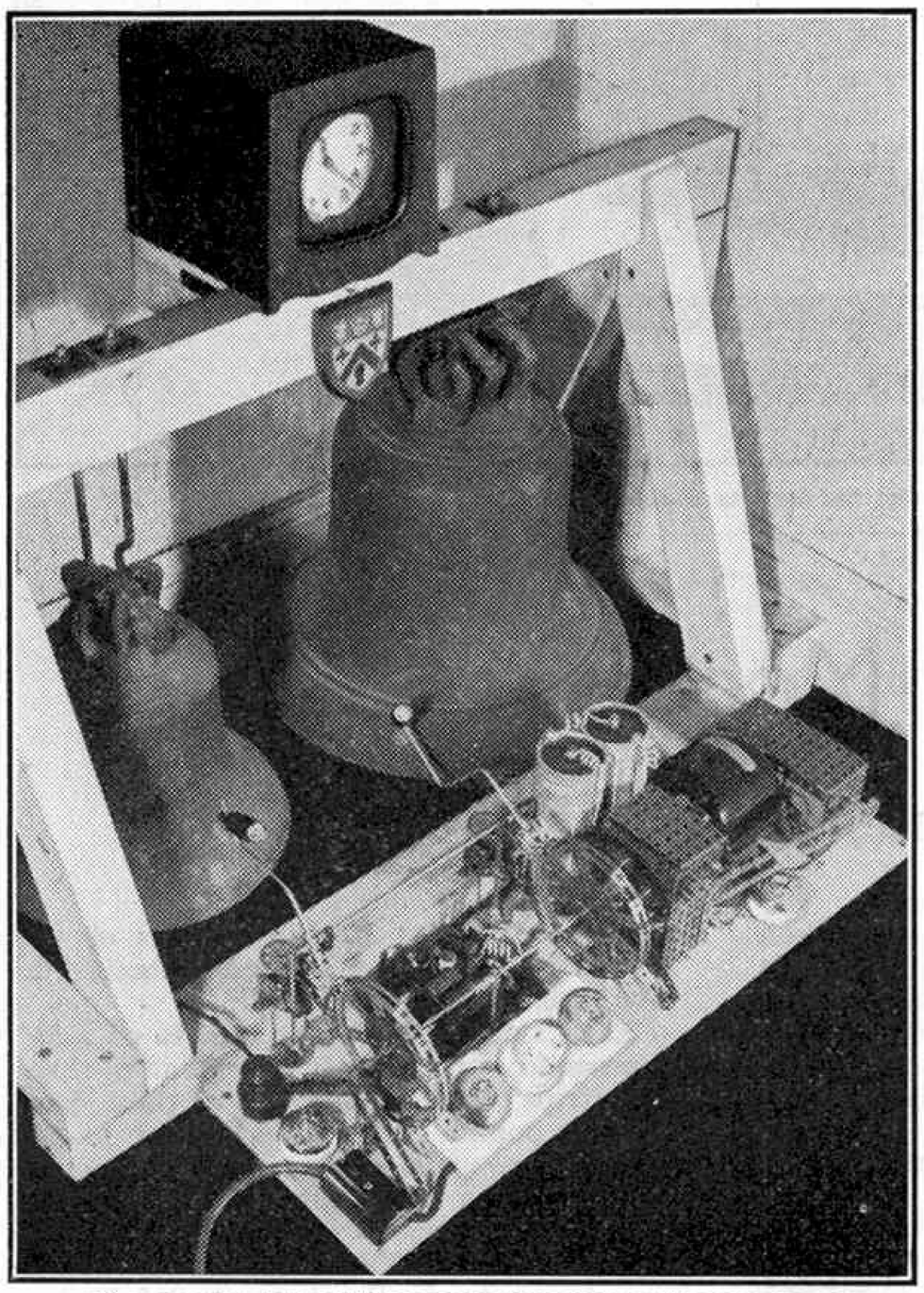
The other stories in the volume are equally exciting. They range from encounters with desert bandits to battles with ice and volcanoes in the Arctic, and include a thrilling account of a bombing raid on a German naval base.

"That Girl Ginger" will be of special interest to our girl readers. Ginger is an orphan who is brought to live in the Ontario countryside, and unexpectedly turns out to be a heroine. The boys and girls of this story are really human, and there is lively interest in the games and plays, jokes and secret ideals in which they indulge.

"Everyday Science"

By A. W. HASLETT
(Scientific Book Club. Members only, 2/6)

Mr. Haslett's book was reviewed in the *"M.M."* in March 1937, and is now reprinted for the benefit of members of the Scientific Book Club. In it the author shows us how the work of scientists affects us directly in practically every corner of our our daily life. He tells us how it transforms our homes, helps us to build them better, improves our foodstuffs and guides the farmer, the manufacturer and the industrialist alike. Every reader will find the story one of the most absorbing interest.



The complete bell striking mechanism referred to on this page.

A Novel Chiming Clock

Meccano Mechanism Strikes the Bells

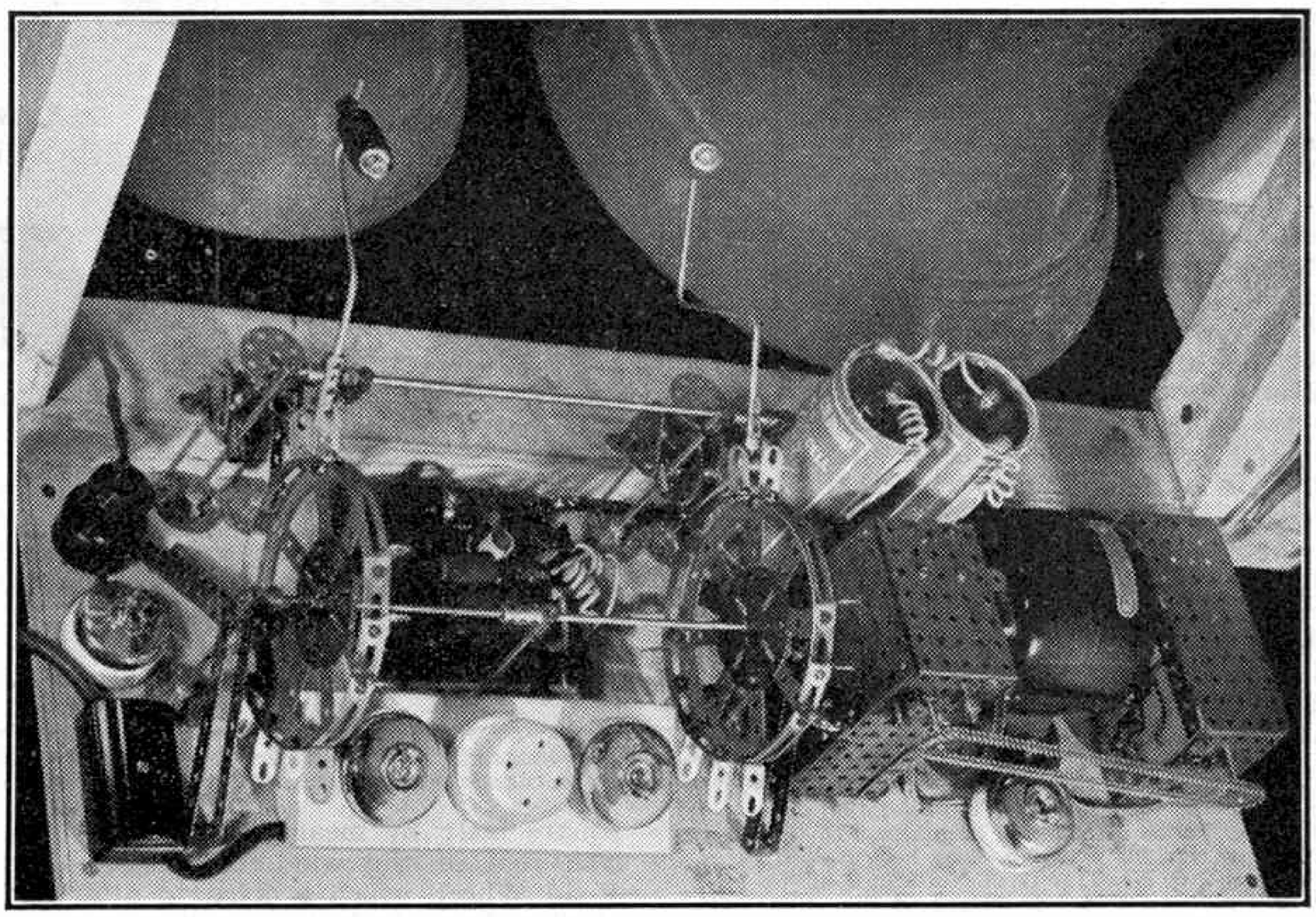
LAST year the two quarter bells of an old striking clock at Clifton College, Bristol, were removed and replaced by new ones. Mr. L. P. Storey, Bristol, who is a keen Meccano model-builder and a reader of the "*M.M.*," thought that it would be a pity for the old bells, known and beloved by generations of old Cliftonians, to be melted down as scrap, and he decided to purchase them and re-erect them at his home. He then set to work to design mechanism for operating the bells automatically in conjunction with an ordinary household clock. After several experiments he built the apparatus shown in the accompanying illustrations. The mechanism is constructed mainly from Meccano parts and operates excellently, the bells chiming the quarters without any attention whatever, apart from periodical winding of the clock. The first quarter chime consists of one double stroke, one on each bell, and there are two, three and four double strokes respectively for the other quarters.

The bells are hung from a stout cradle, the construction of which is shown in the upper illustration. In order to obtain the exact timing of the strikes, it was necessary to construct a very accurate mechanism, and this involved much experimental work.

A cheap alarm clock fixed in an old wireless cabinet determines the strikes in the following manner. An electric circuit, which incorporates a relay energised by two dry cells, is completed by the minute hand of the clock, which makes contact in turn with terminals placed on the dial at each quarter hour point. A relay then operates a switch, which in turn sets in motion a high-voltage $\frac{1}{4}$ h.p. induction type motor. The motor drives through reduction gearing two striking drums consisting of Hub Discs, around the rims of which studs formed by $1'' \times \frac{1}{2}''$ Angle Brackets are arranged and accurately adjusted. These studs operate the bell strikers, which consist of Meccano Ships' Funnels filled with lead shot to give the required weight. The drums make a quarter of a revolution for each quarter hour.

As it is essential that the drums shall make no more nor less than one quarter revolution for each quarter hour period the mechanism by which they are driven had to be timed very accurately. This is achieved by the mechanism on the extreme right in the illustrations. Two copper plates, formed by cutting a ring into two portions, are screwed to the base-board, and the first and third quarter contacts on the clock are wired to one plate and the half hour contact is wired to the other. The circuit incorporating the battery, relay and clock contacts is completed by a rotating trailing contact, which is driven from the gear-box at exactly twice the speed of the striking drums and moves across the faces of the copper plates.

When the minute hand of the clock touches the first quarter contact, the motor, while driving the drum shaft, also operates the contact mechanism. The trailer immediately moves along the "live" plate until it rides off on to the other plate, which is "dead," thus breaking the battery circuit and so stopping the motor at exactly the right moment. This occurs also when the third quarter contact is touched by the minute hand. The position is reversed when the hand touches the half hour contact.



A close-up view of the automatic striking mechanism.

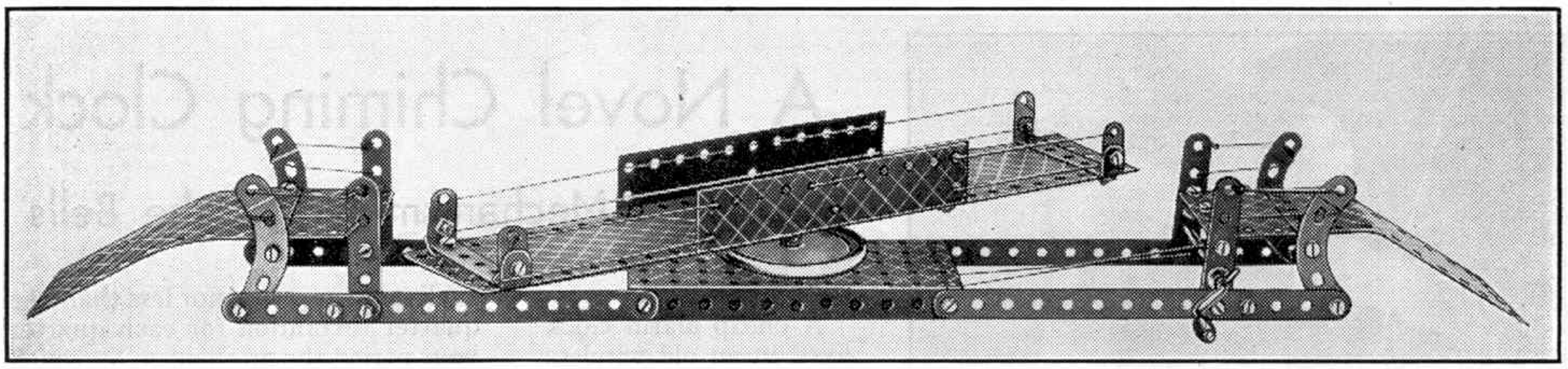


Fig. 1. A simple swing bridge that can be constructed from the parts in Outfit No. 3.

New Meccano Models

Swing Bridge—Wool Winder—Windmill

THE first of the four fine models we are describing this month is a swing bridge that can be built from the contents of Outfit No. 3. This is shown in Fig. 1. Its construction is begun by building the base, which is formed by bolting four $5\frac{1}{2}''$ Strips to the flanges of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. These are extended by bolting a $2\frac{1}{2}''$ Strip to each $5\frac{1}{2}''$ Strip, overlapping them two holes. Two $2\frac{1}{2}''$ Strips and two $2\frac{1}{2}''$ Curved Cranked Strips are bolted to the $2\frac{1}{2}''$ Strips, and $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are held to them by Angle Brackets. Two of the bolts holding the Flexible Plates also hold $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, which are bent to form ramps.

The swinging portion of the bridge is formed by bolting two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate to two $12\frac{1}{2}''$ Strips. The bolts holding the Plates hold also two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates, bent as shown, and at each end a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ U-section Plate, which is straightened out, are fixed to the $12\frac{1}{2}''$ Strips. Four Flat Brackets are bolted to the projecting lugs of the Double Angle Strips to form supports for the handrails, which consist of Cord tied to the Flat Brackets. Two $\frac{3}{4}''$ Discs bolted to the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates forming the sides ensure a level join when the bridge is closed.

The bridge pivots on a $1\frac{1}{2}''$ Rod held in a Bush Wheel. This Rod carries a Road Wheel, which is supported by two $\frac{3}{4}''$ Bolts attached to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate by nuts, and underneath the Flanged Plate a 1" Pulley. The Pulley is connected to a Crank Handle by a length of Cord. The Crank is held by Spring Clips.

Parts required for swing bridge: 2 of No. 1; 4 of No. 2; 8 of No. 5; 4 of No. 10; 8 of No. 12; 1 of No. 18a; 1 of No. 19g; 1 of No. 22; 50 of No. 37a; 52 of No. 37b; 4 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 2 of No. 111c; 1 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 200; 2 of No. 27b.

The second of our new models this month is a working windmill designed for Outfit No. 5. This is shown in Fig. 2. Its square body is first built. This is composed of four $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, which are joined together by means of Angle Brackets. The tubular portion forming the top of the windmill consists of two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates 1, which overlap each other three holes and are fixed to the square body by means of Flat Brackets. The roof of the windmill consists of a Road Wheel, which is fixed to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip by a bolt gripped by the setscrew in the boss of the Road Wheel. The $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip is bolted to the tubular portion of the windmill. The legs are made up from four $5\frac{1}{2}''$ Strips, which are bolted to the corners of the square body, their ends being attached to the base.

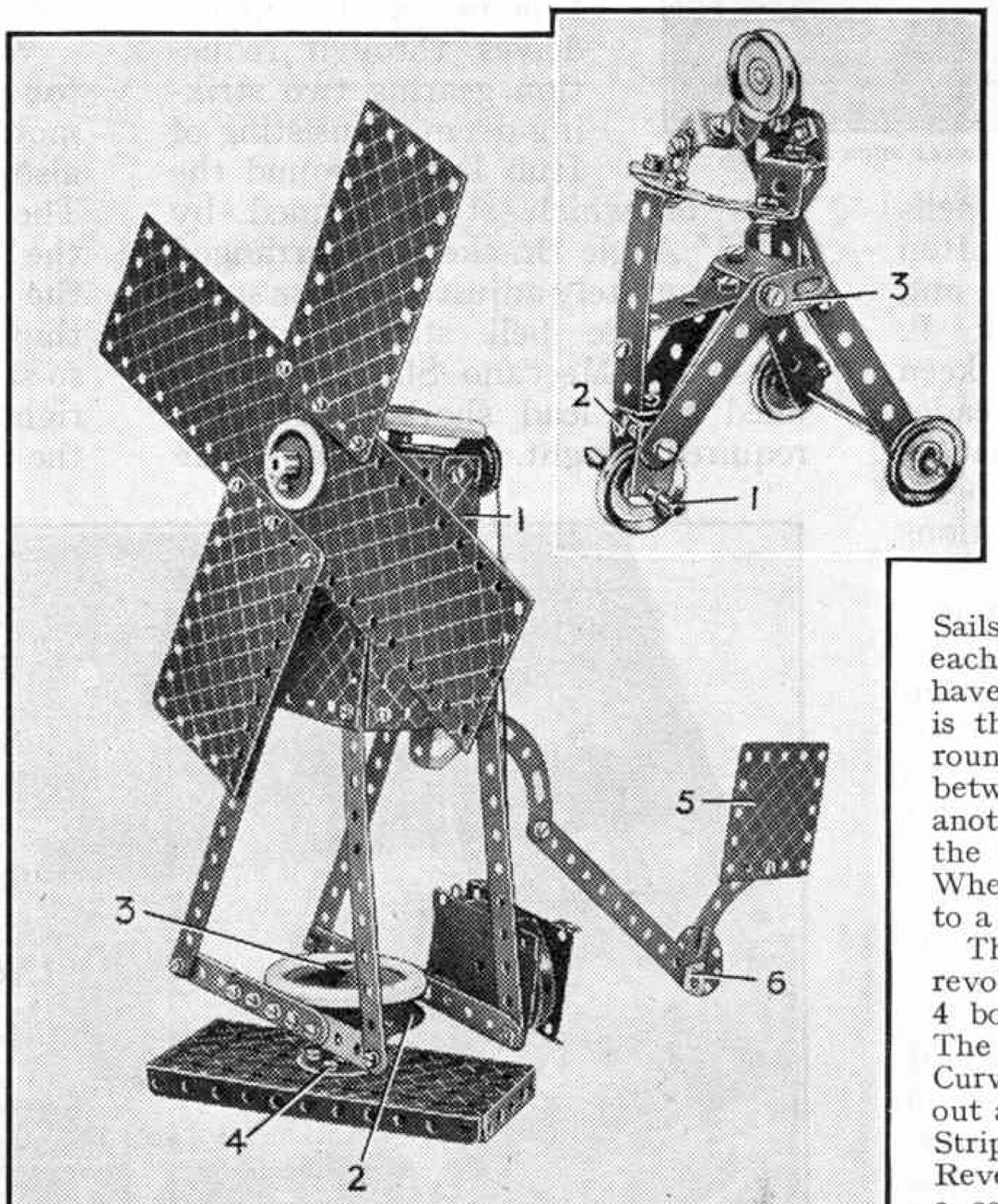


Fig. 2. A working windmill fitted with a Magic Motor. Fig 3 above shows a simple model boy on tricycle, which can be built from parts in Outfit No. 1.

Each side of the base consists of a $5\frac{1}{2}''$ compound strip formed by joining three $2\frac{1}{2}''$ Strips together, and two of these compound strips are attached to the two pairs of legs. The compound strips are bolted to a circular plate made up from two Semi-Circular Plates joined by means of Angle Brackets. A $2\frac{1}{2}''$ Rod is inserted in the centre hole of the circular plate and is retained in place by a Road Wheel 3, which is above the Circular Plate and a 1" Pulley Wheel below the Plate.

The sails of the model are formed by overlapping two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates one hole and bolting them end to end. Two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are then bolted to these at right angles, so forming a cross, each arm of which is 4" long. A $4\frac{1}{2}''$ Rod is pushed through the centre of the Sails and fitted with a Pulley Wheel on each side of them. Both Pulley Wheels have Rubber Tyres on them. The Rod is then passed through the top of the rounded body, with a $\frac{1}{2}''$ loose Pulley between the 1" Pulley and the frame, and another 1" Pulley on the other end of the Rod. The last-mentioned Pulley Wheel is connected by a Driving Band to a *Magic* Motor bolted to the frame.

The Rod on which the whole structure revolves is passed through a Bush Wheel 4 bolted to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. The wind vane consists of a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Curved Plate 5, which is straightened out and bolted to a $2\frac{1}{2}''$ Cranked Curved Strip. The latter in turn is bolted to a Reversed Angle Bracket 6 attached to a second Reversed Angle Bracket on which is lock-nutted a $1\frac{1}{4}''$ Disc. The Reversed Angle Bracket 6 is bolted to a $5\frac{1}{2}''$ Strip, which in turn is bolted to a Trunnion fixed to the square body. The lock-nutted Disc is arranged so as it touches the floor, and all bolts are tightened up so that as the windmill rotates the Disc rolls along the ground.

Parts required to build the windmill: 5 of No. 2; 6 of No. 5; 6 of No. 9d; 4 of No. 10; 10 of No. 12; 1 of No. 15a; 4 of No. 22; 1 of No. 23; 1 of No. 24; 62 of No. 37; 1 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 125; 1 of No. 126; 2 of No. 142; 2 of No. 187;

2 of No. 198; 4 of No. 190; 2 of No. 191; 2 of No. 192; 1 of No. 199; 2 of No. 214; 1 of No. 217a.

The simple model boy and tricycle shown in Fig. 2 will delight and interest the younger members of the family. It is easily made from the contents of a No. 1 Outfit.

The tricycle is constructed by bolting a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip to a second $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip two holes from one end. The Double Angle Strip, which forms the crossbar of the machine, is bolted across a Bush Wheel. Two Angle Brackets, bolted in the form of a Double Bracket to the end of the crossbar, are attached to two $2\frac{1}{2}''$ Strips that form the fork for the rear wheels, which are mounted on a $3\frac{1}{2}''$ Axle Rod journalled in the Strips. The wheels are two 1″ Pulleys locked on the Rod with their centre bosses facing towards the inside.

The front fork is made up from a Flat Bracket bolted to each side of a Double Bracket, which is built up of two Angle Brackets fixed to the end of the vertical $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. A 2″ Rod journalled in the Flat Brackets provides a pivot for the 1″ Pulley representing the front wheel. The 2″ Rod is held in place with Spring Clips. A $2\frac{1}{2}''$ Curved Strip is bolted through its centre hole to the $2\frac{1}{2}'' \times \frac{1}{2}''$ vertical Double Angle Strip to form the handlebars of the machine.

The body of the boy consists of a Flat Trunnion and an ordinary Trunnion, which are bolted together as shown. The flange of the Trunnion is bolted to the Bush Wheel that represents the seat. The boy's head is a 1″ Pulley, connected to the body by a Flat Bracket. His right arm is made up of two Angle Brackets arranged to form a Reversed Angle Bracket, and joined to an Angle Bracket that is attached to the handlebars. The left arm is built from a Reversed Angle Bracket and an ordinary Angle Bracket. A $2\frac{1}{2}''$ Strip is used for the right leg and is attached to the top of the Flat Bracket forming part of the front fork. The left leg is attached to the front fork in a similar manner, and its other end is connected to a Flat Bracket as shown.

Parts required to make model boy on tricycle: 4 of No. 5; 4 of No. 10; 8 of No. 12; 1 of No. 16; 1 of No. 17; 3 of No. 22; 1 of No. 24; 2 of No. 35; 21 of No. 37a; 22 of No. 37b; 1 of No. 48a; 1 of No. 98; 2 of No. 126; 2 of No. 126a.

It usually takes two people to wind a ball of wool, one person to hold the skein and another to wind the ball, but with the help of the ingenious and sturdy model shown in Figs. 4 and 5 the work can be carried out quickly and easily by only one person. The framework of the model consists of four $24\frac{1}{2}''$ Angle Girders that are bolted to two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Perforated Flanged Plates, the joints being strengthened by $1\frac{1}{2}''$ Corner Brackets. Four $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 1 are joined to the Flanged Plates and the Angle Girders, and four $2\frac{1}{2}''$ Angle Girders 2 are bolted to each side member to strengthen the framework. Four $5\frac{1}{2}''$ Angle Girders 3 are joined to the $2\frac{1}{2}''$ Angle Girders 2, and the centre holes of the Girders 3 provide bearings for a compound Rod 4, which consists of an 8″ and an $11\frac{1}{2}''$ Rod joined together by a Coupling. The framework is strengthened by $5\frac{1}{2}''$ Angle Girders 6 and 7.

A 20-volt Electric Motor is bolted to one of the lower side members and to the Angle Girders 7, and it is geared down as shown. A 1″ Pulley on the armature shaft of the Motor drives a 1″ Pulley on a Rod 9 that is mounted in bearings consisting of two $2\frac{1}{2}''$ Strips, the ends of which are bolted to two $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. Rod 9 also carries a fixed $\frac{1}{2}''$ Pinion 10, which meshes with a 57-teeth Gear free on the $2\frac{1}{2}''$ Rod 11. The 57-teeth Gear causes a free $\frac{1}{2}''$ Pinion on the same shaft to revolve with it owing to the head of a $\frac{3}{8}''$ Bolt inserted in the boss of the latter Pinion engaging between two Nuts and Bolts screwed into the Gear Wheel. The free $\frac{1}{2}''$ Pinion meshes with a loose 57-teeth Gear on the Rod 9, and this Gear causes a free $\frac{3}{4}''$ Pinion 12 to revolve with it. The Pinion 12 meshes with a 50-teeth Gear 13 fixed on the Rod 11, and a $\frac{1}{2}''$ Pinion 14 on this Rod meshes with a $\frac{3}{4}''$ Contrate Wheel fixed on the Rod 4. The gear-box is attached to the frame as shown.

A Pinion is attached at each end of the Rod 4, and each of these meshes with a $1\frac{1}{2}''$ Contrate Wheel on a $3\frac{1}{2}''$ Rod. This Rod also carries a 1″ Pulley 15, which is connected by a 10″ Driving Band to a 1″ Pulley on the lower end of the Rod 16. This Rod is journalled in one end of a $12\frac{1}{2}''$ Angle Girder and in a Double Bent Strip bolted to the $12\frac{1}{2}''$ Angle Girder. A $1\frac{1}{2}''$ Rod on which the $12\frac{1}{2}''$ Angle Girder is pivoted is journalled in one of the Flat Plates 1 and a Double Bent Strip. The skein of wool is placed on the two reels, each of which is built up from two 4″ Circular Plates joined together by four $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips and a Face Plate.

Ratchet mechanism is provided to prevent the skein of wool from drawing the reels close together. It consists of a Pawl, which is fixed on a $3\frac{1}{2}''$ Rod that carries a Crank. This Rod is journalled in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip that is joined to a Flat Trunnion and the side member. The Pawl is kept in engagement with the Ratchet Wheel, which is fixed to a $3\frac{1}{2}''$ Crank Handle with Erinoid Grip.

Parts required to build model wool winding machine: 4 of No. 2; 2 of No. 5; 4 of No. 7; 2 of No. 8; 6 of No. 9; 8 of No. 9d; 2 of No. 10; 1 of No. 13; 1 of No. 13a; 2 of No. 15b; 3 of No. 16; 1 of No. 16a; 1 of No. 17; 2 of No. 18a; 1 of No. 19g; 6 of No. 22; 2 of No. 24; 1 of No. 25; 5 of No. 26; 1 of No. 27; 2 of No. 27a; 2 of No. 28; 1 of No. 29; 120 of No. 77af; 116 of No. 37bf; 23 of No. 38; 1 of No. 40; 1 of No. 43; 4 of No. 45; 2 of No. 48; 9 of No. 48a; 2 of No. 52; 13 of No. 59; 1 of No. 62; 1 of No. 63; 4 of No. 70; 2 of No. 109; 2 of No. 111c; 1 of No. 126; 2 of No. 126a; 8 of No. 133; 4 of No. 136; 4 of No. 146a; 1 of No. 147a; 1 of No. 148; 2 of No. 176; 1 of No. 186a; 2 of No. 186b; 1 20-volt Electric Motor E120.

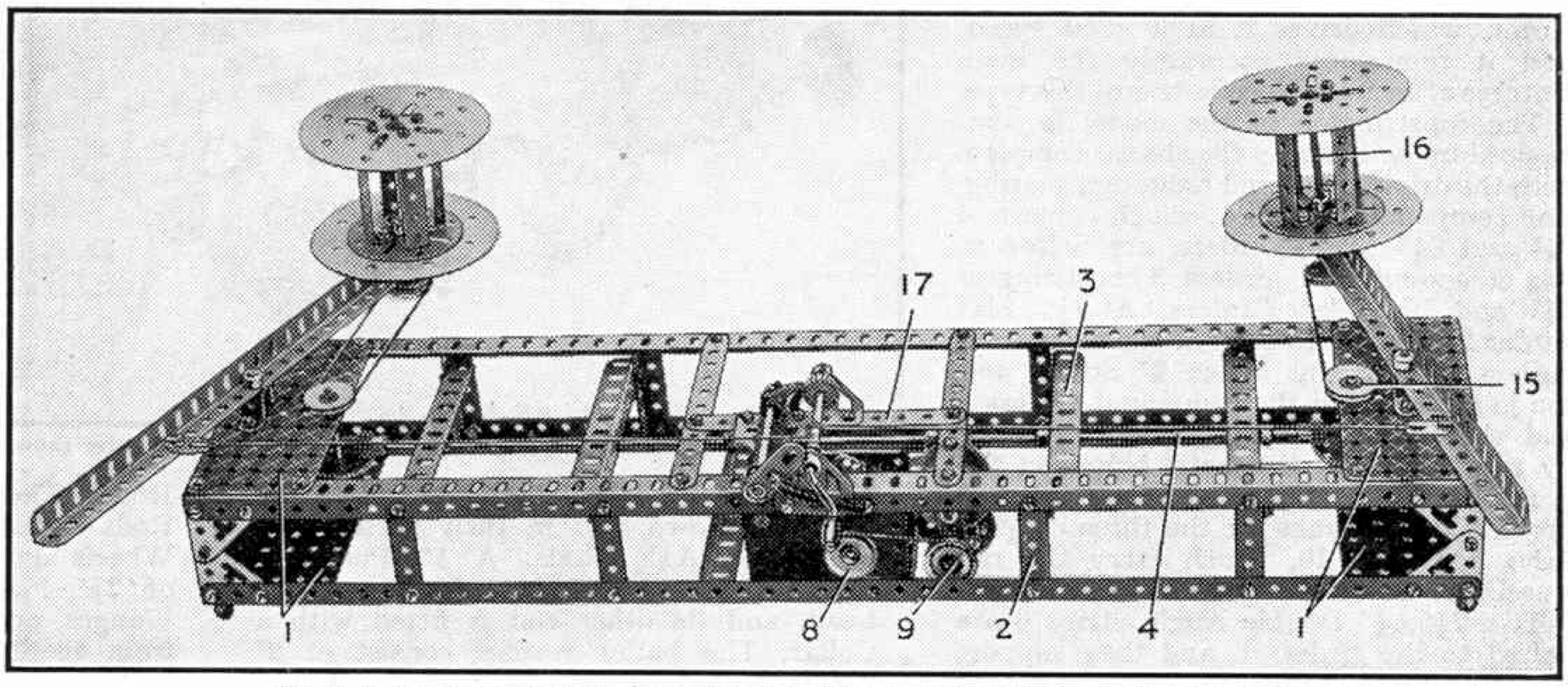


Fig. 4. A simple model that will be found useful for winding skeins of wool into balls.

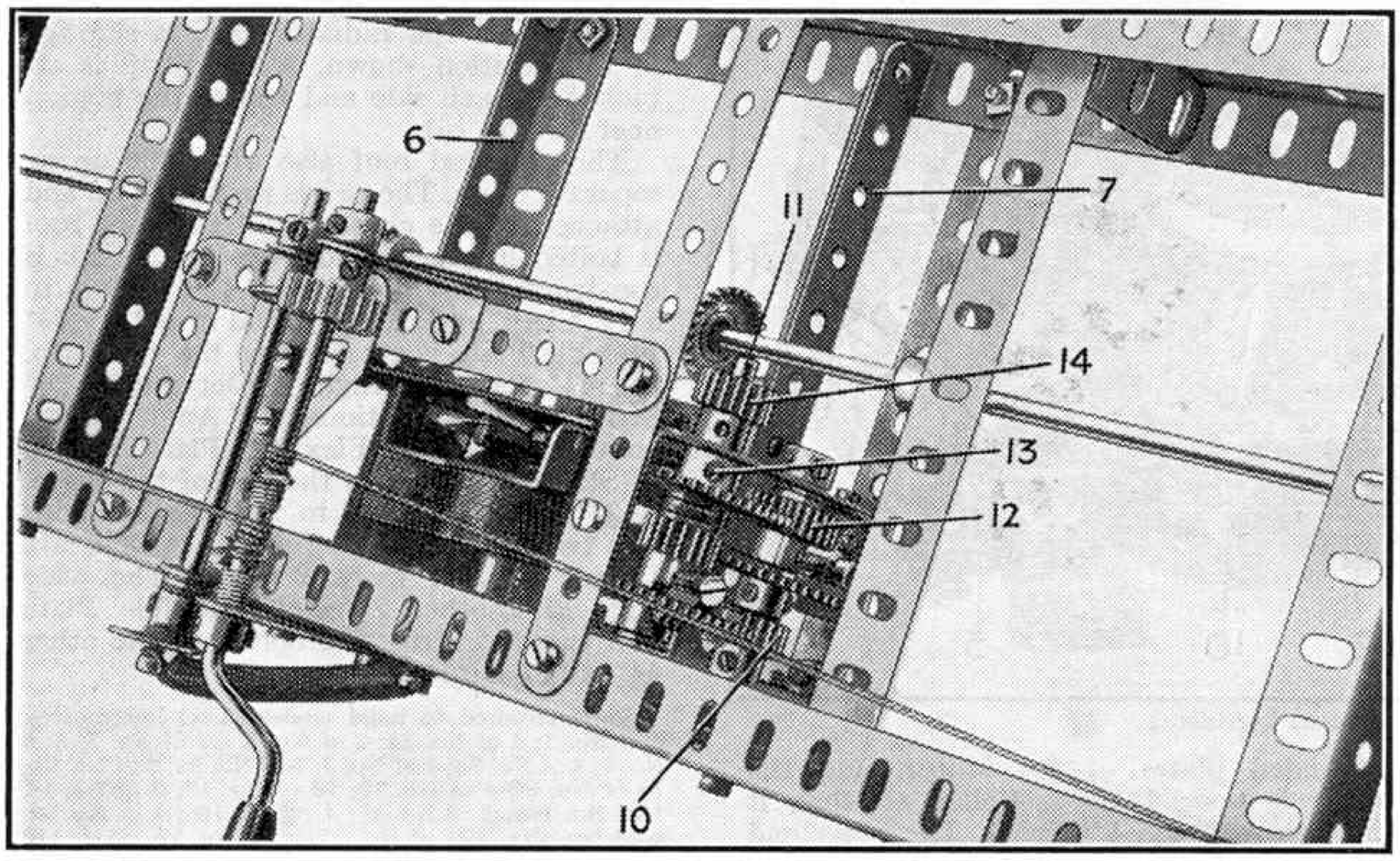
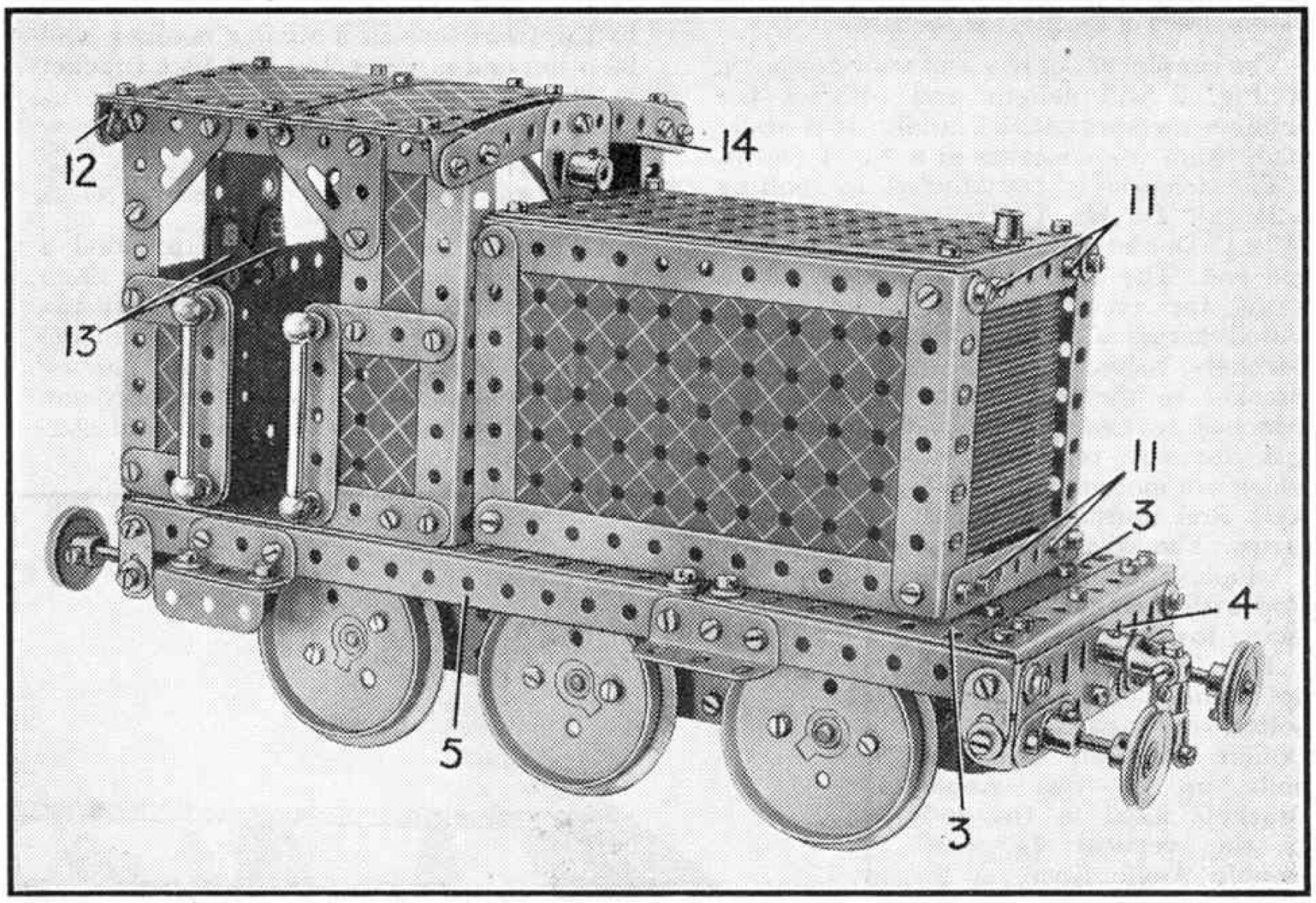


Fig. 5. A close-up view of the wool winder, showing details of the mechanism.

A Meccano Diesel Locomotive



The constructional details of the fine model Diesel locomotive shown here are described on this page.

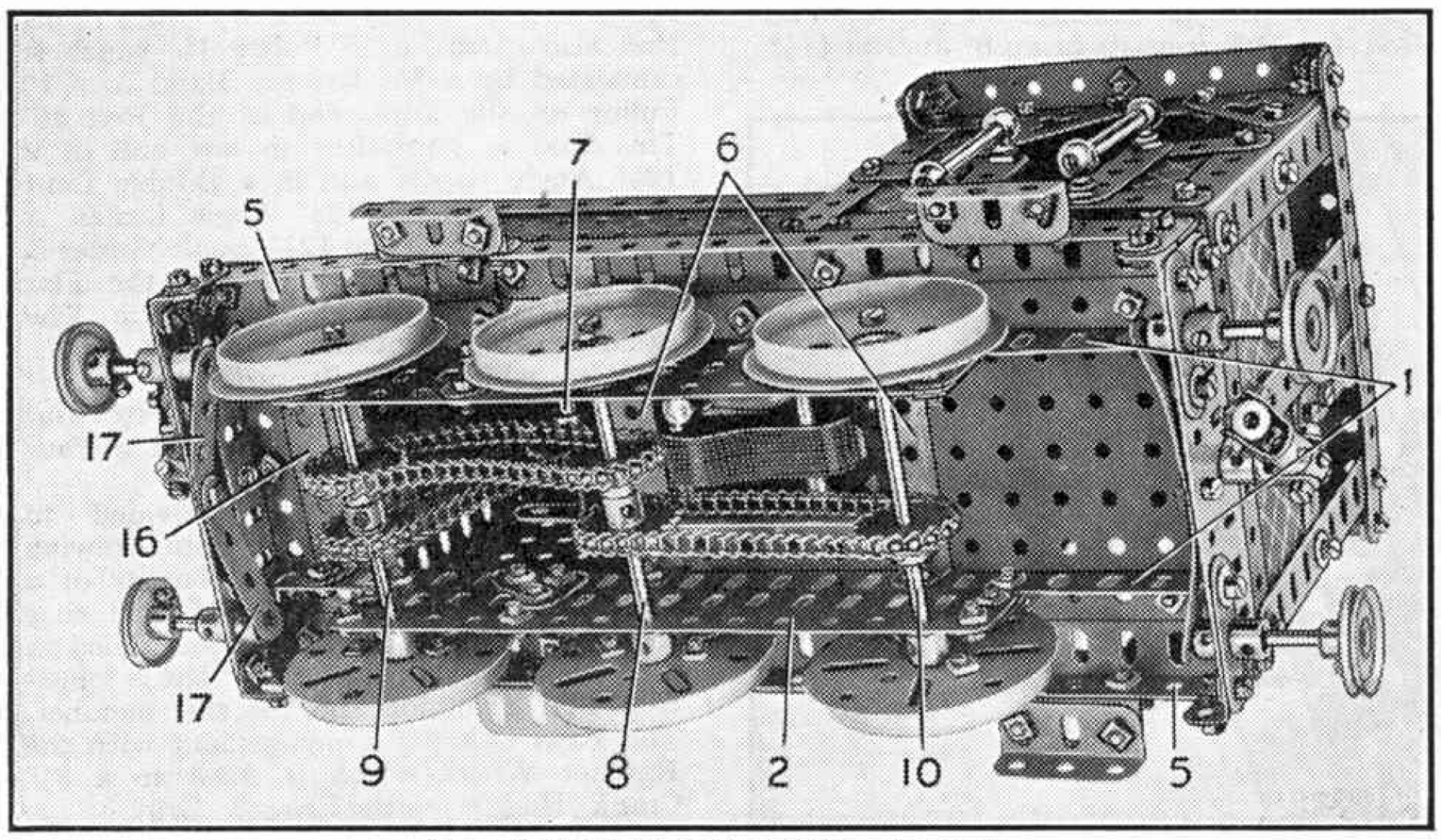
A NEW model of an unusual type that will interest Meccano enthusiasts who possess the parts necessary to build it is the neat Diesel locomotive shown in Fig. 1 on this page. It is fitted with an Electric Motor, which drives it at a good speed, and it reproduces accurately the main features of an actual locomotive of this type.

The construction of the model is commenced by building up the chassis complete with the driving unit and reduction gearing. The compound girders 1, which consist of $7\frac{1}{2}''$ and $3\frac{1}{2}''$ Angle Girders, are bolted to the compound flat girders 3 consisting of $7\frac{1}{2}''$ and $3\frac{1}{2}''$ Flat Girders. A $7\frac{1}{2}''$ Flat Girder 2 is joined to each of the compound girders 1 by means of six 2″ Strips, and the joints between the compound girders 1 and the Flat Girders 2 are strengthened by two 1″ Corner Brackets, bolted in the positions shown. The two Flat Girders 2 provide the bearings for the three coupled axles 8, 9 and 10, which carry the rail wheels.

Two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 6 are bolted to the girders 1, and they support an E1 or E6 type Electric Motor. Another $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 16 is fixed to the girders 1, and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate is bolted to it. The cab footplate is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Plate bolted to girders 1 and the assembled flat girders 3.

Two $4\frac{1}{2}''$ Angle Girders, one at the back and the other at the front of the locomotive, are bolted to the chassis, and to each of them a Flat Girder 4 is attached to form the buffer beams. The flanges of two built-up girders 5, which consist of $7\frac{1}{2}''$ and $3\frac{1}{2}''$ Angle Girders, are attached to the compound flat girders 3 to form guards. Two $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets join the ends of each of the girders 5 to the buffer beams, and four Flat Brackets, which are joined to four $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets bolted to the buffer beams, are secured to the guards. Two Double Arm Cranks are bolted to each of the buffer beams in the positions shown, and in their bosses they carry $1\frac{1}{2}''$ Axle Rods. A 1″ Pulley is attached to each Rod to form a buffer head, and its other end is fitted with a Collar. The buffer springs consist of 2″ Strips bolted at one end to the buffer beam, their other ends resting on the Collars. Two Swivel Bearings are bolted together by means of a $\frac{1}{2}''$ Bolt to form a train coupling, one of which is attached to each buffer beam.

The Motor is geared to the driving wheels in the following manner. A $\frac{1}{2}''$ Pinion attached to the armature shaft of the Motor meshes with a 57-teeth Gear Wheel fixed to a 3″ Rod. The Rod is mounted in the extended plates of the Motor, and the Gear is spaced by a Collar so that it meshes with the $\frac{1}{2}''$ Pinion. The other end of this Rod carries a $\frac{1}{2}''$ Pinion that meshes with a 57-teeth Gear attached to the 2″ Rod 7. This Rod is supported in the end holes of the extended plates of the Motor, and it carries a 1″ Sprocket Wheel that drives a second similar wheel on the $3\frac{1}{2}''$ Rod 9. Then the drive is taken to the $3\frac{1}{2}''$ Rods 8 and 10 by means of 1″ Sprocket Wheels and Chain. The rail wheels consist of $2\frac{1}{2}''$ Face Plates attached to Wheel Flanges, and they are spaced by Washers from the Flat Girders 2 to prevent the bolts in their bosses from engaging those holding the Flat Girders in place.



An underneath view of the Diesel Locomotive.

The bonnet of the locomotive is built up as a separate unit and is bolted to the chassis when completed. Four $3\frac{1}{2}''$ Angle Girders are joined together to form the radiator and four $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets are bolted on two opposite Girders by the Bolts 11. Two 3″ Screwed Rods are inserted vertically in the pairs of Angle Brackets and the space at the front of the bonnet is filled in with $2\frac{1}{2}''$ Strips spaced from each other by Washers. Three $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Perforated Flat Plates and four $5\frac{1}{2}''$ Angle Girders are bolted to the three $3\frac{1}{2}''$ Angle Girders, and the casing of a Spring Buffer, which forms the radiator cap, is screwed in the position shown. A $3\frac{1}{2}''$ Strip is attached to each side and top of the bonnet near to the cab.

The cab and roof also are built up as separate units. The cab is first built up and attached to the chassis, and then the roof is bolted in place. Each side of the cab is constructed by joining two $4\frac{1}{2}''$ Girders to a $4\frac{1}{2}''$ Strip, and then one end of a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate is attached to the $4\frac{1}{2}''$ Strip, the $4\frac{1}{2}''$ forward Angle Girder and a $2\frac{1}{2}''$ Strip. The last mentioned $4\frac{1}{2}''$ Angle Girder, another $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate and a 2″ Strip are joined to the end of the Plate. A $2\frac{1}{2}''$ Strip is bolted to the two 2″ Strips by two Handrail Supports, which are joined together by a 2″ Rod. The wide edge of another $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate and two $1\frac{1}{2}''$ Strips are bolted to the other $4\frac{1}{2}''$ Angle Girder.

Parts required to build model Diesel Locomotive: 2 of No. 2; 3 of No. 2a; 2 of No. 3; 39 of No. 5; 8 of No. 6; 4 of No. 8b; 4 of No. 9; 7 of No. 9a; 9 of No. 9b; 10 of No. 9f; 4 of No. 10; 16 of No. 12; 3 of No. 16; 1 of No. 16b; 5 of No. 17; 4 of No. 18a; 4 of No. 22; 2 of No. 27a; 193 of No. 37af; 180 of No. 37bf; 110 of No. 38; 3 of No. 48a; 2 of No. 48c; 3 of No. 52a; 1 of No. 53a; 6 of No. 59; 4 of No. 62b; 2 of No. 80c; 2 of No. 89; 1 of No. 94; 6 of No. 96; 2 of No. 103c; 2 of No. 103d; 4 of No. 103k; 6 of No. 109; 2 of No. 111a; 1 of No. 111c; 1 of No. 120a; 1 of No. 126a; 4 of No. 133; 4 of No. 133a; 8 of No. 136; 6 of No. 137; 4 of No. 165; 1 of No. 179; 8 of No. 188; 2 of No. 190; 2 of No. 192; Electric Motor E6.

Prizes for Model-Builders

By "Spanner"

Results of Recent Contests and Details of New Competitions

Meccano "Suggestions" Competition

In this Contest we are offering prizes for details of novel and original Meccano mechanisms, workshop gadgets, or devices of any kind that are suitable for inclusion in the *"Suggestions Section"* pages of the *"Meccano Magazine."*

Good examples of what are required are miniature differentials and clutch arrangements suitable for incorporating in model motor cars, automatic reversing and electric timing mechanisms and opening and closing grabs for cranes. New gear-boxes of all kinds, braking devices and ingenious and unusual forms of ratchet and free wheel mechanisms also will be welcome. A glance at the *"Suggestions Section"* pages of recent *"M.M.'s"* will show exactly the kind of thing required, and it will be seen that there is very wide scope for original ideas.

It should be noted that it is not necessary to design a complete model. For example, if the suggestion to be submitted is a brake mechanism for a motor car it is only necessary to design the actual brake gear itself; a complete chassis is not required.

Competitors should send details of their suggestions to *"Suggestions Competition,"* Meccano Ltd., Binns Road, Liverpool 13. The mechanism or other device should be explained as fully and clearly as possible, and should be illustrated by photographs or drawings. Entries must be posted so as to reach Liverpool not later than 30th November.

The prizes to be awarded for the best suggestions submitted are: First, Meccano or Hornby products value £3/3/–; Second, products value £2/2/–; Third, products value £1/1/–. There will be also five prizes of products value 10/6, and five of products value 5/–.

It is not absolutely necessary for the competitor to build up the device in Meccano before submitting his entry. Many devices that would form suitable entries can easily be described without actually constructing them. All entries, however, must be original.

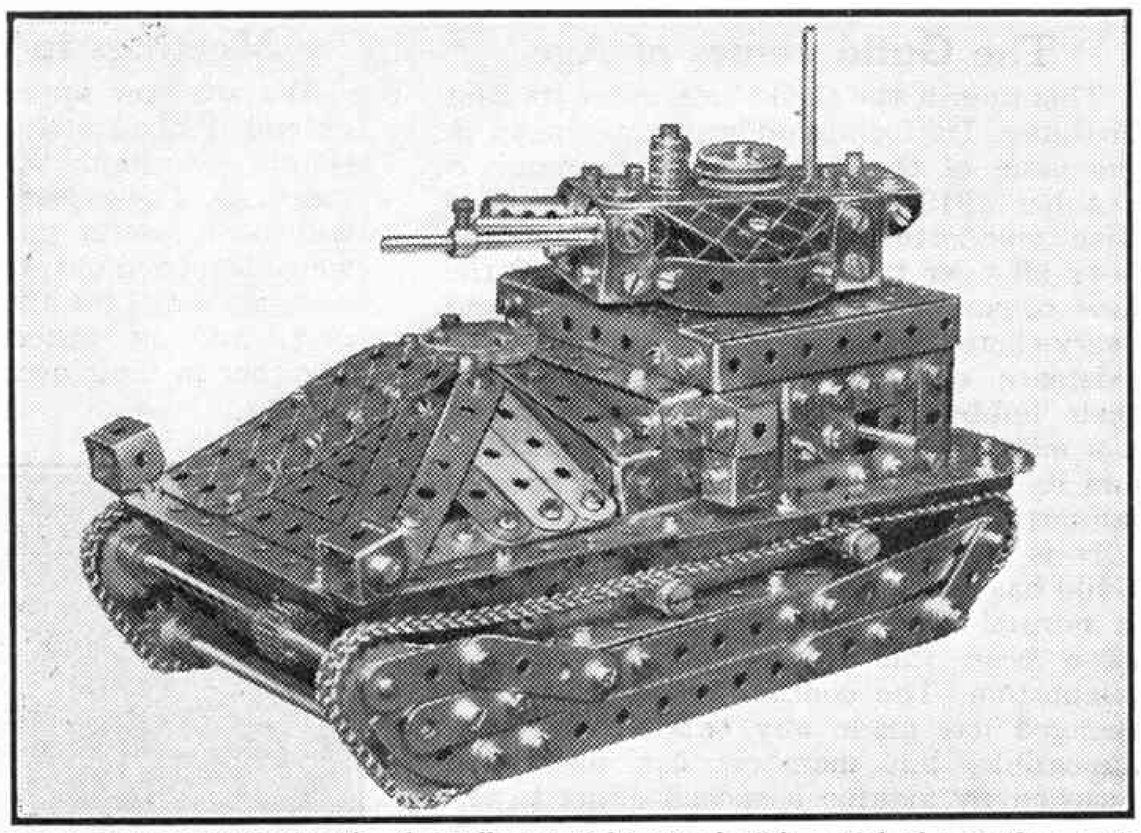
Results of "Allied Fighting Forces" Model-Building Contest

The full list of prize-winners in the *"Allied Fighting Forces Model-Building Contest,"* is as follows:

1st Prize, Cheque for £3/3/–: F. G. Rich, Orpington;
2nd, products value £2/2/–: G. Balfour, Upminster;
3rd, products value £1/1/–: J. K. Darby, A. Bleasby and J. Marsden, Holmfirth.
Products value 10/6: A. Ellis, Sutton Coldfield; F. Davies, Stewartby; J. Matthews, Fillongley; A. Wilson, Luton; E. Rusted, Nuneaton.
Products value 5/–: A. Wilson, Girvan; R. Parker, St. Leonards-on-Sea; R. Naisbitt, East Herrington; R. Warrington, Huddersfield; D. Scruby, Bideford.

First Prize was awarded for the fine model of a Short "Sunderland" flying boat shown in the lower illustration on this page. It is the work of F. G. Rich, and is excellently proportioned and constructed. Inside the fuselage are three Electric Motors, which drive the four airscrews, the revolving gun turrets, the tail planes and the rudder control. The formidable armament of the actual machine is reproduced as closely as possible, and every effort has been made to ensure that these parts are in scale with the other details of the model. Several of Mr. Rich's models have been illustrated in the *"M.M.,"* and readers who are able to refer to them will note that clean and sturdy construction are outstanding features of this model-builder's work and have won him success in previous competitions.

The Second and Third prizes were awarded for model aircraft carriers, G. Balfour's entry being a well-built reproduction of H.M.S. *"Eagle,"* while J. K. Darby, A. Bleasby and J. Marsden combined their Meccano parts to build a large model of H.M.S. *"Ark Royal."* Both of these fine models closely resemble the actual ships they represent and are fitted with searchlights, multiple pom-pom and anti-aircraft guns. Torpedo tubes and anti-torpedo bulges also are included, and there are miniature hand-operated cranes and lifts to transport aeroplanes between the hangars in the hull and the deck.



Many interesting constructional details are to be seen in this model of a medium tank which was built by E. Rusted, Nuneaton.

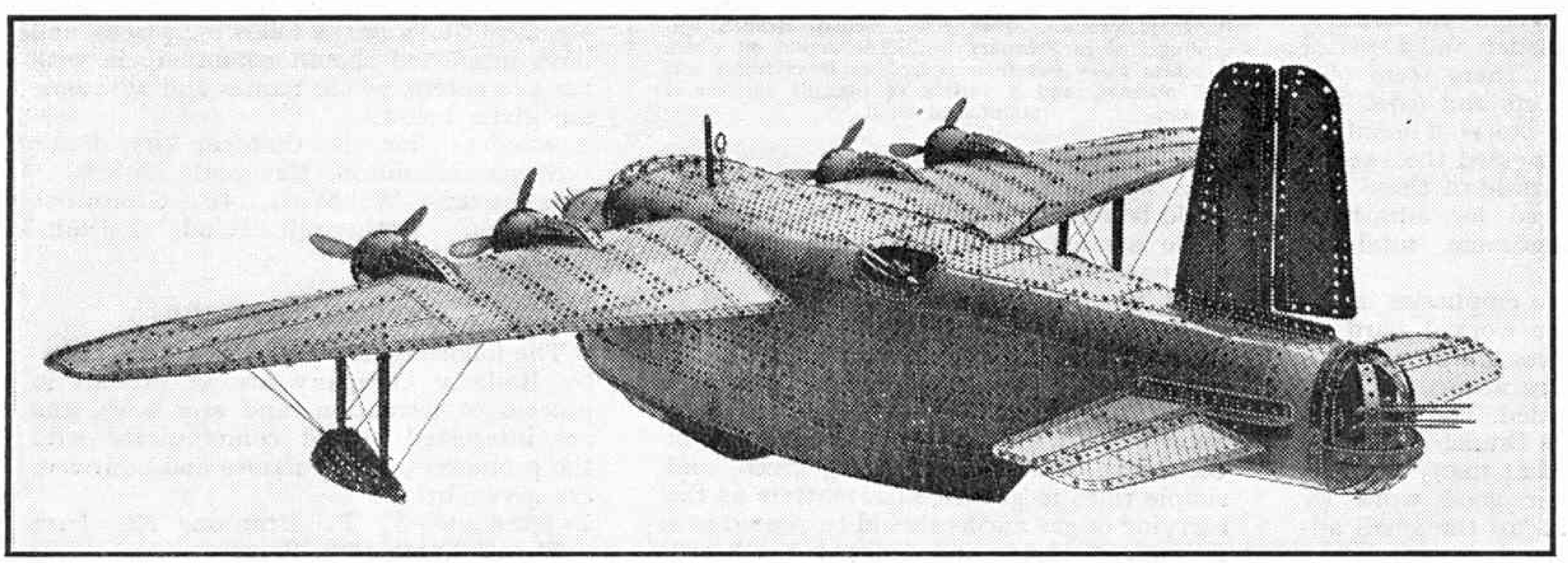
Many models of tanks were prominent among the entries, and one of the best of these was built by E. Rusted. This is shown in the upper illustration and is based on an actual tank of the medium type. The creeper tracks are driven by a No. 1 Clockwork Motor.

Puzzles and Mystery Models Contest Results

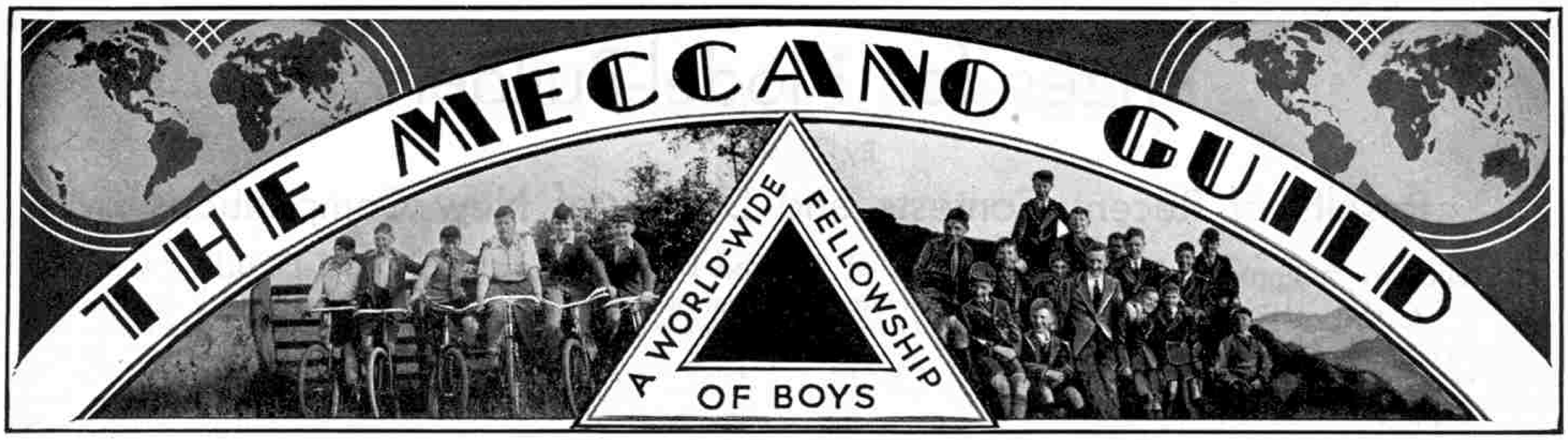
The principal prizes in the "Puzzles and Mystery Models" Contest announced in the *"M.M."* have been awarded to the competitors named in the following list.

1st Prize, Meccano or Hornby products value £3/3/–: T. Tasker, Barnsley, 2nd, products value £2/2/–: H. Garratt, Bournemouth. 3rd, products value £1/1/–: D. Rigg, Port Elizabeth, S. Africa.

A Selection of the best and most interesting entries will be described in *"Suggestions Section"* of the *"M.M."* from time to time.



This model of a Short "Sunderland" flying boat is a remarkable example of Meccano construction. It was built by F. G. Rich, Orpington, who was awarded First Prize in the "Allied Fighting Forces" Contest.



The Guild comes of Age

This month the Guild celebrates its 21st birthday. Its formation was announced in the issue of the "*M.M.*" for September-October 1919, and its birth was greeted with wonderful enthusiasm by Meccano boys all over the world. These joined the new organisation in large numbers, and everywhere Meccano Clubs sprang into existence so that members could enjoy their hobby together. To-day the Guild has more than 100,000 enrolled members, and its blue and white Badge has become famous throughout the world.

It is a matter for rejoicing that the Guild has made such amazing progress, and in normal times its coming of age would have been the signal for some special celebration. The conflict in which we are engaged has made any extensive scheme impossible, but members can mark the occasion by making a special effort to extend the influence of the Guild. They can do this best by getting their friends to join, and by endeavouring to unite the members they know into a club. Those who are already members of a club can look round for recruits, or try to find some other way of extending the influence of the Guild. All can take pride in belonging to an organisation that has done so much for boys of every country in the world.

A Fine Exhibition

An Exhibition is within the capacity of every Club, large or small, as the Upper Wharfedale Branch has proved. The members of this Branch make up for lack of numbers by their enthusiasm, and they organised a fine display with the double object of showing what they do and of making a contribution to the "*M.M.*" Radio Fund. The exhibits included an excellent model railway, complete with scenery made by members themselves, together with Meccano models and a special display of ship models. There were also stalls for the sale of sweets and toys. The toys were taken from the stores of members and friends, who also provided the sweets, and the proceeds of the sale of these and of the small fee charged for admission amounted to the handsome total of £4 3s. 8d.

What I wish chiefly to emphasise is the fact that every member worked hard to make the display a success. Personal effort is called for on these occasions, and invariably it is well rewarded. The members of the Upper Wharfedale Branch spared no effort, with the result that many of their visitors recognised their good work by adding a further amount to the small admission fee they had already paid.

Every Club and Branch should try to make an effort of this kind.

Meetings in the Blackout

We are now approaching the season of extended blackouts, and officials of Clubs should overhaul their arrangements for meetings. The experience gained last winter will be a useful guide. Various methods were then tried out. In some Clubs meetings were arranged for afternoons or early evenings, and in others members gathered together in their own homes. In all special care was taken to ensure that no light could be seen from Club and Branch rooms, while arrangements were made to meet the possibility of air raid warnings. This point must be kept well in mind, and if really suitable shelter cannot be provided, preferably on the club premises but at any rate within very easy reach, meetings should not be held. Every member must know exactly what he is expected to do in the event of a warning being given, and simple rules to govern such matters as the carrying of gas masks should be posted in a prominent place, and learned by heart. Finally, the safety measures decided upon must be practised repeatedly.

The Rev. D. Sire is Chairman of the Blackfriars School (Laxton) Branch of the H.R.C., No. 388; secretary, P. J. McNamara. This active School Branch was incorporated in February last. The layout on which members carry out their operations is extensive and well planned, and a variety of realistic services is maintained on it.

Demonstrations for Photographic Sections

There is good work to be done by Photographic Sections of Clubs and Branches during the winter months. Valuable help in arranging a programme can be obtained by writing to such firms as Johnson and Sons Manufacturing Chemists Ltd., Hendon, Burroughs Wellcome and Company, London, and any other firm whose advertisements appear regularly in the "*M.M.*", and who supply photographic material. These firms will send free of charge material and data for a practical demonstration or lecture to be given by a member of the Club or Branch, and in some cases they will even send a representative, if it can be guaranteed that a good number will be present at the meeting. Parents and friends could be invited to enjoy an evening in the Club or Branch when a special event of this kind is arranged.

Along with these interesting demonstrations the programme should include good talks by officials and members on special subjects, but care should be taken that there is plenty of practical work. If a small subscription is arranged funds will soon be available for buying what is needed. Small pieces such as a Johnson's developing tank, two or three dishes, a graduated glass measure and a dark room lamp can be bought first, and made available for the use of all members. Later, when funds have accumulated, an enlarger or a lantern may be added. By working along these lines a very valuable photographic section with ample resources can soon be built up, and the result will be greater enjoyment for all members who are interested in the hobby.

Proposed Clubs

Attempts are being made to establish Meccano Clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

AUSTRALIA—Mr. R. Cudden, 169, Parry Street, Hamilton, Newcastle, N.S.W.

BELLSHILL—W. Weir, 40, Glenmore Avenue, Motherwell Road, Bellshill, Lanarkshire.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

CAMBERLEY—P. F. Brimson, 82, Park Street, Camberley, Surrey.

LEEDS—R. A. Brining, 18, Windsor Mount, Whitkirk, Leeds.

Club and Branch News

Club Notes

Praze School (Camborne) M.C.—Evacuation and sickness have hampered Club work, but good progress is again being made. Members were delighted to receive their Affiliation Certificate, which has been framed. Steady work continues, and an Exhibition has been planned. The Club's resources have been increased by the addition of a Hornby Train Set, so that train operations can now be carried out. Club roll: 9. *Secretary:* D. James, Carnowall Farm, Praze, Camborne, Cornwall.

Ecclesall M.C.—This newly affiliated Club is having a successful time. A good meeting place has been secured and excellent models have been built. Models constructed at one meeting were of a military character, including army lorries, a field howitzer, an anti-aircraft gun and a coastal defence gun. At another meeting aeronautical subjects were built. All models submitted are carefully judged and marks awarded are entered on a certificate signed by the Leader. At meetings tea is very kindly provided by Mrs. Cantrell. Cycle runs also are arranged. Club roll: 6. *Secretary:* T. K. Jones, 327, Millhouses Lane, Sheffield 11.

Helmsley Methodist Sunday School M.C.—This Club has been founded by Mr. R. W. Shooter, Leader of the Hornsea M.C., and successful meetings have been held. Interesting models constructed have included a porters' truck, with which the Junior members had some good fun, and aeroplanes. Mr. Shooter has given a Talk on "The Working of a Modern Locomotive," and other events have included cricket and games such as Mah-Jongg and Monopoly. Club roll: 11. *Leader:* R. W. Shooter, c/o Miss King, Ashdale House, Bondgate, Helmsley, York.

Hornsea M.C.—Mr. Shooter's scheme for training members in lecturing and taking meetings has been very successful, and certificates have been awarded to those who have become qualified. Cricket is played regularly, members of the Hornsea Evacuee Club taking part in the games, and bowls is another outdoor game that has been introduced. The Woodwork Section has recommenced meetings, under the guidance of Mr. A. Tawn, and Cinema Shows and Talks continue. There has been an increase in membership, but more members are wanted, and all enquiries should be sent to Mr. A. Tawn, Deputy Leader, 15, Marlborough Avenue, Hornsea, or the secretary. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

Acton M.C.—At Meccano construction meetings a Meccanograph, a tramcar and gantry crane have been built. The models were then dismantled and all Meccano parts carefully stored and counted in readiness for removal to new Headquarters. Rambles in the neighbourhood have been held, and games competitions also organised have been keenly contested. A new Hornby Train layout is being constructed. Club roll: 15. *Secretary:* S. W. Simmons, 37, Derwentwater Rd., Acton, London W.3.

Totnes M.C.—A recent report deals with A.R.P. work in the Club. An Ambulance Section has now been formed, to give members some idea of First Aid methods, and at various times members have taken part in Army welfare schemes. New books have been obtained for the Club Library, which is growing steadily. Cricket matches have been played between the two sections of the Club, the "Nuts" and "Bolts," and tracking games also have been played. Club roll: 20. *Secretary:* T. J. Macnamara, "Gables," Totnes.

St. Oswalds M.C.—Mr. W. T. Jaques, Leader, has been called up for military service, and the Leadership has been taken over jointly by Mr. L. Fleck and Mr. C. B. Chapman. An extensive summer programme of outdoor activities has been followed. This has included track meetings in Mr. Fleck's garden, a spy hunt on the lines of the well-known treasure hunt, and games. An effort is being made to increase membership, and all who wish to join are asked to get into touch with the secretary. Club roll: 25. *Secretary:* J. F. Jaques, "El Molino," 5, Ingham Road, Thornton Heath, Surrey.

AUSTRALIA

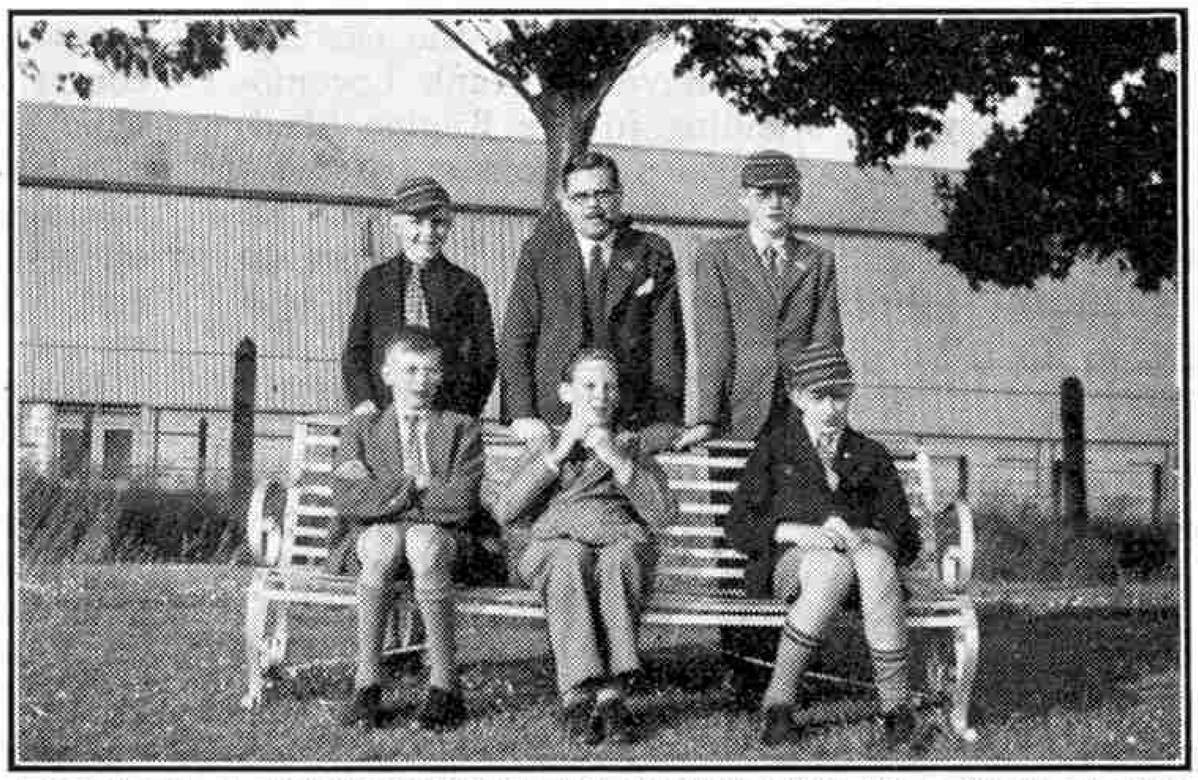
Thebarton Technical School M.C. — This old established Club continues to hold good meetings, the programmes at which are interesting and varied. In addition to Model-building members have enjoyed Film Shows of railway and other subjects, and the projector used to give one of these was partly constructed of Meccano. The subject of an attractive Model-building Contest was the topical one of war-like instruments. A Demonstration of glass-blowing has been given by Mr. Gibson, Leader of the Club. Club roll: 60. *Secretary:* R. Hale, Thebarton Technical High School, Ashly Street, Thebarton, South Australia.

Mr. W. T. Jaques, Leader of the St. Oswalds (Thornton Heath) M.C., and Mr. J. F. Jaques, secretary, with their mother, a staunch supporter of the club. The St. Oswalds M.C. was affiliated in December 1935, and has a continuous record of splendid work in which model-building competitions and games have been the chief features.

Branch News

Loughton (Essex).—The annual meeting is to be held this month in order to elect officers for the coming year and to discuss the winter programme. This will consist mainly of train operations on the Branch layout, and Games also will be played. Shooting with an air rifle has been added to the list of recreations. Members are showing great keenness in this new pursuit. *Secretary:* G. W. Russell, 10, Elmhurst Way, Loughton.

Picardy (Belvedere).—Special nights are set apart for train operations, which are carried out on a Hornby-Dublo layout, and Games, including billiards and Monopoly. On track nights plans for layouts are made by members and one is selected for use. Funds are now being raised by means of a Concert and other efforts to purchase a Hornby-Dublo layout. A recruiting drive is taking place. *Secretary:* L. J. M. Wood, 67, Picardy Road, Belvedere, Kent.



A cheery group of members of the Totnes M.C. with their Leader, Mr. P. Harvey, who is in the centre of the back row. T. J. Macnamara, secretary, is on the Leader's right. Besides model-building the programme includes games, and an ambulance section has been formed. An Exhibition and a conjuring display by Mr. Macnamara, father of the secretary, were the means of contributing £5 2s. to the "M.M." Radio Fund recently, and members have been responsible for excellent soldiers' canteen work.

Greenlands (Buxton).—Preparations are being completed for the winter sessions, new officials having been elected and rules decided. Meetings will be held in the early evenings, and will be devoted chiefly to train operations on the Branch layout. Steady progress is being made with the Branch's contribution to the "*M.M.*" Radio Fund, in which members are keenly interested. *Secretary:* J. R. Swain, Greenwood, College Road, Buxton.

Coldean (Brighton).—At all meetings the Branch Hornby Railway is operated, all members taking part in the necessary working. Talks on railway subjects also are given regularly. The subject of one of these was "*The Southern Railway*," and all were informative and attractive. *Secretary:* H. Bellchambers, 30, West Drive, Park Side, Brighton 6.

Carmarthen.—Meetings have been devoted chiefly to the usual track operations. At one of these the engine of an express was derailed, giving the opportunity for the running of a breakdown "special." The loop line to the second Branch room has been constructed, and there is telephone communication between the two rooms in use. Many games have been enjoyed, and members also have taken part in Meccano model-building, miniature aeroplane construction and air rifle shooting. Photographic demonstrations and chemical experiments were the subjects of other meetings, and a Table Tennis Tournament has been held. *Secretary:* J. D. Lewis, 7, Spilman Street, Carmarthen.

Edgbaston (Birmingham).—A new track has been laid down with a low level station, the line through which includes short sections of steep gradients. A working timetable has been made up and operations in accordance with it are now being tried out. The Junior Section of the Branch is proving very successful. *Secretary:* R. Teare, 531, City Road, Edgbaston, Birmingham 17.

Upper Wharfedale.—The Branch Exhibition was a great success. Careful experiments had been made in order to decide upon the layout for use at the display, and this was equipped with roads and scenery, including an hotel and a farm. Models of ships also were displayed, and Sweets and Toy Stalls were organised, the wares on these being given by members and their parents. There was a splendid attendance and the sum of £4 3s. 8d. was raised for the "*M.M.*" Radio Fund for the R.A.F. *Secretary:* D. H. Scales, 1, The Avenue, Grassington.

Waterloo (Dublin). — Timetables are regularly brought up to date, to suit traffic on the Branch layout. Blackout arrangements for railway working have been made. Carriage running boards and platform edges have been painted white, and all station nameplates have been removed. A Hornby Cattle Truck has been added to the Branch rolling stock, which now includes five locomotives, a fine array of coaches and two rail cars. Dinky Toys Lorries also are employed in operations. *Secretary:* S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

AUSTRALIA

Melbourne. — Members have devised various improvements in the Branch layout, including a siding that is electrified only when points are set for it and a new type of speed controller. These have been tested in practice. Operations have been carried out on the electrified layout of two of the members, and a Dublo electric railway has been demonstrated. A "Mystery Control" demonstration puzzled members. A train ran on the club track when nobody was present in the room, and none of the members was able to solve the puzzle. A demonstration of electrical instruments and devices was given by Mr. L. Ison, Leader and Secretary, the experiments leading up to automatic train control. At track meetings members have taken turns in supervising train running, the remaining members acting as drivers, signalmen, control board operators, etc. *Secretary:* L. Ison, 8, Hayes St., Northcote, N.16 Victoria, Australia.

NEW ZEALAND

Wellington West.—At the last annual meeting it was unanimously decided to lay down a Hornby-Dublo track for use at Branch meetings. A Birthday Cake was cut at this meeting by the oldest member, and a presentation was made to a member who had not been absent from any meeting throughout the year. Later work on the construction of the Hornby-Dublo layout was started. *Secretary:* K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington, New Zealand.

"Junior's" Hornby-Dublo Railway

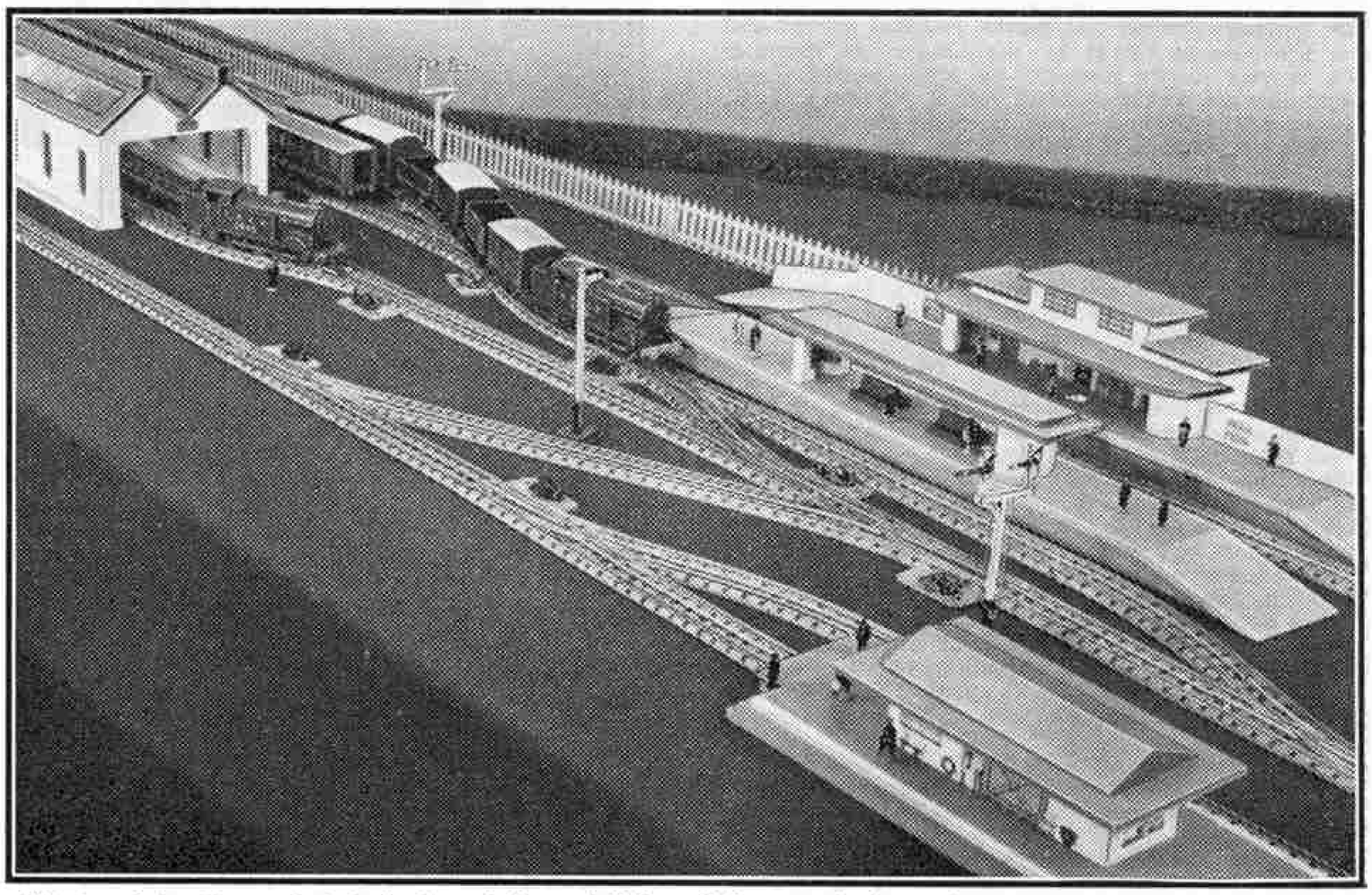
By "The Superintendent"

This article, we hope, will be the first of many intended to appeal specially to the younger members of the Hornby-Dublo "family." It is written by "The Superintendent," a seasoned miniature railwayman, and incorporates suggestions developed by him and his assistant "Junior." "Junior" is a typical Hornby-Dublo boy in the earlier stages of the miniature railway hobby. We shall hear more of him as time goes on and the subjects dealt with will be of direct interest to all boys who are about to start a Hornby-Dublo system, or who have some Dublo material but are not quite sure how to develop their systems on practical lines.

"Junior" has been pulling my leg. He says, and perhaps he's right, that the layout described by "*Skipper*" in the May issue of "*Meccano Magazine*" is much too elaborate for him, considering the amount of pocket money he has to spend. So will I please either increase his weekly money or design him a layout which, while starting economically, can eventually blossom out into a really fine layout? Well, here you are; the diagram on this page shows a compact little layout that will fit nicely into a space 8 ft. long by 4 ft. wide.

The railway consists of a continuous line with a country station and goods yard, and by means of a diagonal track line running from the S.E. corner to the N.W. corner trains can leave and enter the station at will. To start the layout only three buildings are necessary. We can use the complete Hornby-Dublo Main Line Station and the Island Platform, or the Island Platform alone. Next we need the Hornby-Dublo Goods Station, and lastly the Engine Shed. As to rolling stock, let's commence with a couple of standard 0–6–2 tank engines, a two-coach Articulated Unit and a dozen goods Wagons.

For the track we shall need to use a few Hornby-Dublo Isolating Rails, but I think it will give you all more fun if I let you work out the positions of these for yourselves. To get the best out of the layout you should have a double output Dublo Transformer No. 2 and two Controllers so that you can have two trains running at once. Having built up the layout, here's a set of operations that will give you plenty of fun.



"Next we bring the goods train back on to its road." A realistic scene during train operations on "Junior's" layout.

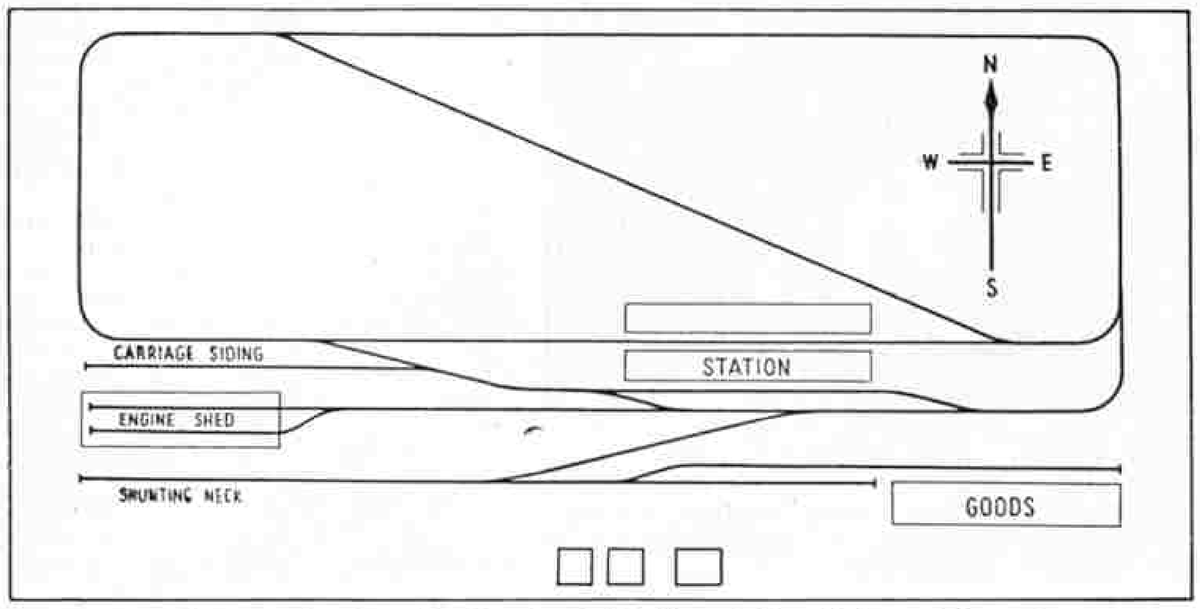


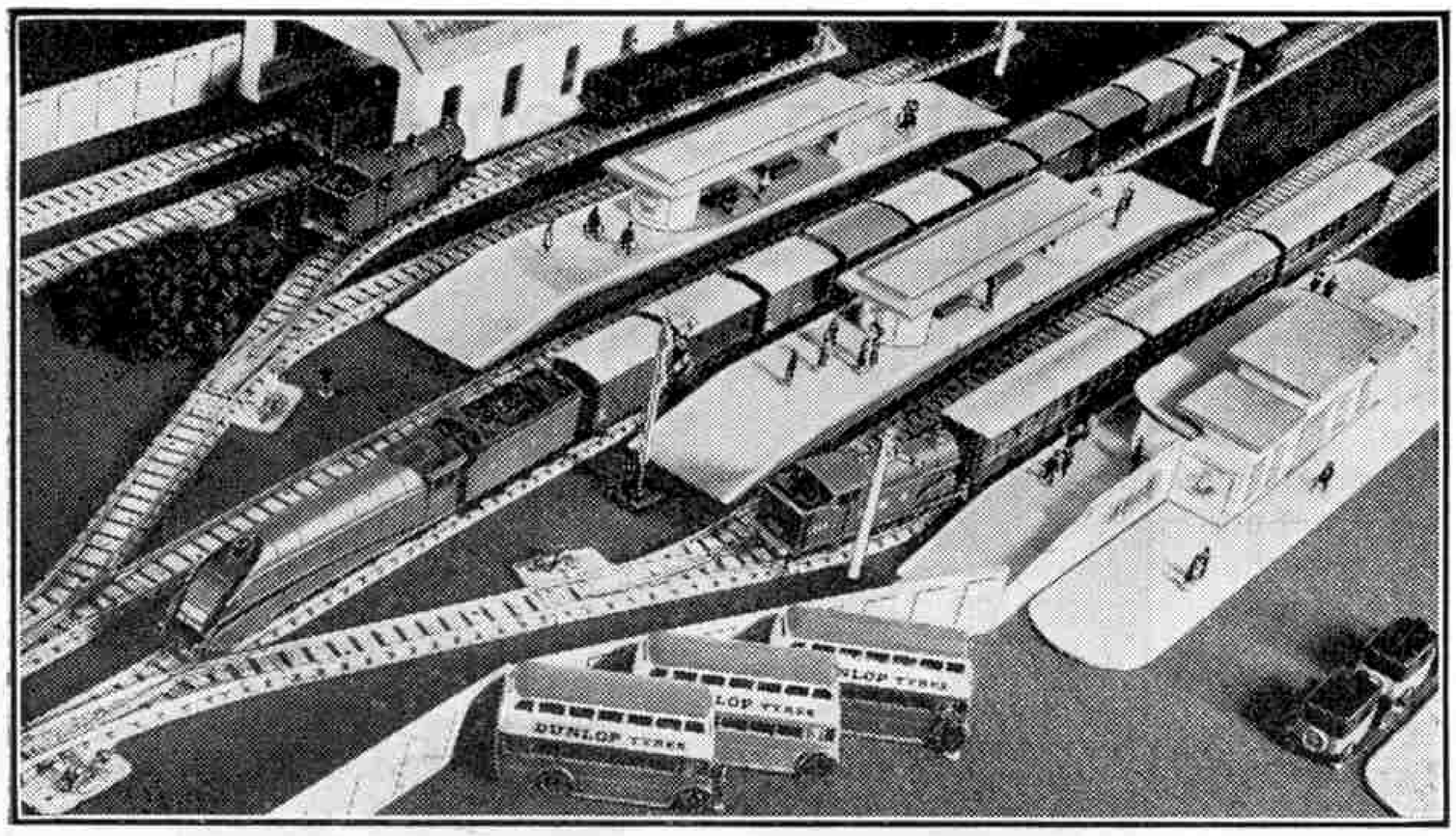
Diagram showing the Hornby-Dublo layout described on this page.

To start with, we have the Articulated Unit standing in the carriage siding. We have two tank Locomotives standing in the Engine Shed, and our various Wagons on the lines serving the Goods Station. Now we run Tank Locomotive No. 1 on to the Articulated Unit, and pull into one of the roads south of the station. We uncouple the engine, and run it round the train via the parallel road and the crossover, and then back it on to the front of the Articulated Unit. Off we go on to the main line in a clockwise direction, and we have this train running.

Now start up Locomotive No. 2 and, using the shunting neck, make up a goods train, drawing the required wagons from the goods yard tracks and making up the train on the second of the two roads south of the station. When this train is ready we pass our passenger train, which all this time has been running round the main continuous line, via the diagonal crossing line from the N.W. corner of the oval to the S.E. corner, and so back to the road from which it started. Our goods train is now ready to leave, and once it is on the main line we can start getting our passenger engine on to the front end of its train ready for another circuit.

Next we bring our goods train back on to its road, but before we start shunting we must get our engine on to the other end of the train. You'll find lots of fun shunting and sorting your goods Wagons on to the two yard roads.

There is quite a number of other "episodes," such as leaving a horse box at the end of one of the roads to be attached to the passenger train. Some of these I hope to tell you about at a later date. In the meantime "Junior" seems very satisfied that he has started with the best model railway material in the world, that of the Hornby-Dublo System.



An express goods train runs through while a local passenger train is held to give it "the road." Note the station and locomotive depot arrangement, characteristic of an outer suburban station of real practice.

Fun with your Hornby-Dublo Railway

L.N.E.R. Operations in 00 Gauge

MOST readers will agree that the best fun in miniature railway operation is had when the model system is based on an actual railway or section of full-size lines. This month we take L.N.E.R. practice as our subject, and make suggestions for its reproduction in miniature with the material of the Hornby-Dublo System.

The L.N.E.R. is a good system to adopt as the prototype for a Hornby-Dublo railway. Many features of its practice are characteristic, special attention is given to various kinds of traffic, and allowance has been made for this in planning the equipment of the Hornby-Dublo range. To give one instance only, for the moment, both passenger and goods train sets are available in L.N.E.R. colours and style in the Hornby-Dublo system, so that a complete service of trains based on actual East Coast operations can be run.

The L.N.E.R. main line from King's Cross constitutes the "East Coast Route" between England and Scotland, and many of the standard East Coast trains can be reproduced by means of Hornby-Dublo components. Long-distance non-stop running is easily possible on an electrically operated layout, while clockwork systems are specially suited to the operation of trains stopping intermediately, yet booked to run at a fairly high speed between stations.

In the assembly of most L.N.E.R. expresses the standard unit employed is a single corridor coach together with an articulated twin, of which one of the vehicles is a brake composite. These are exactly the items selected for modelling in the Hornby-Dublo range. There is a realistic Two-Coach Articulated Unit and a separate Corridor Coach, which together make up an excellent train. Miniature "*Scotsmen*" or the important Yorkshire and North-County trains generally, can thus be run effectively.

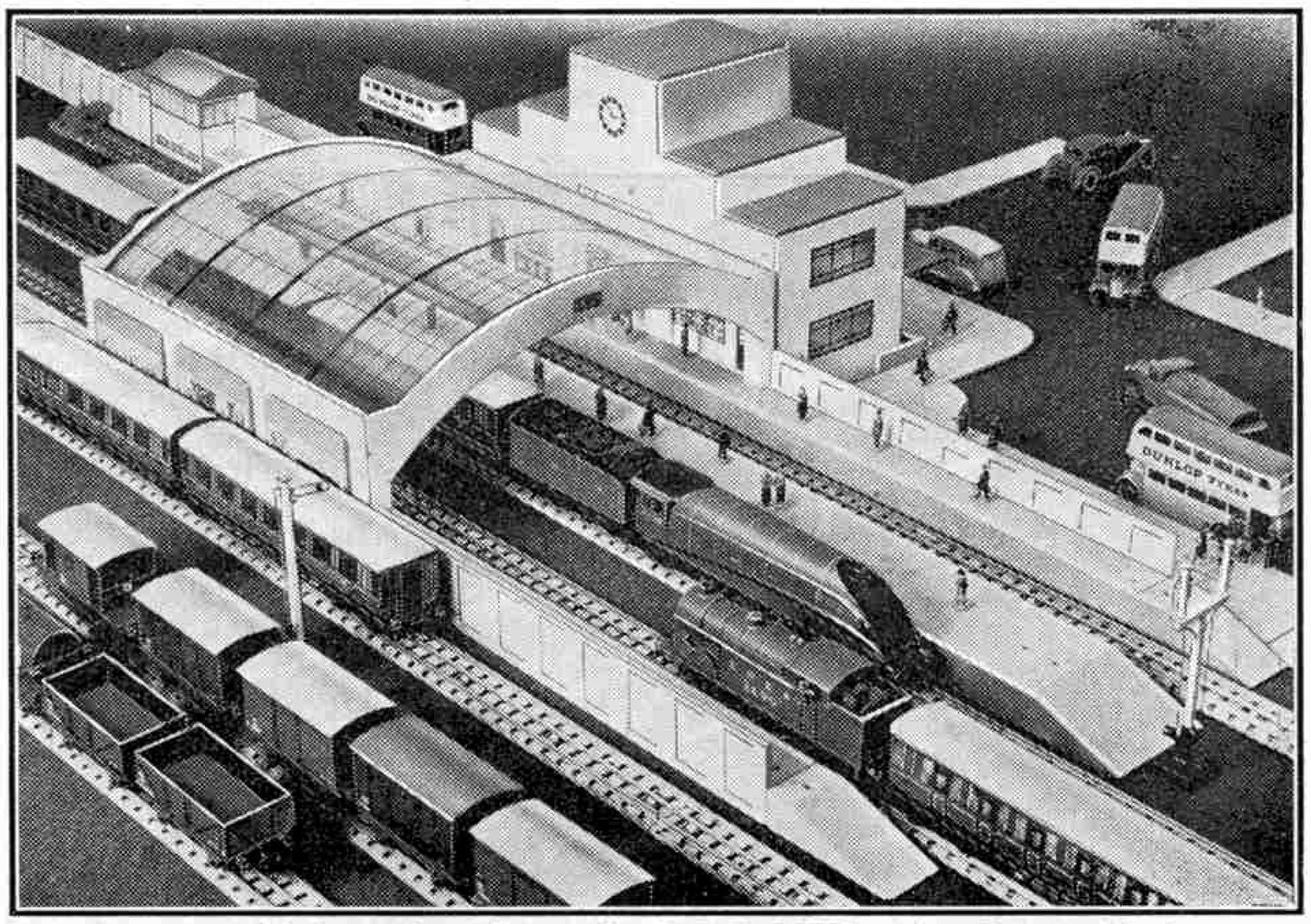
The engine of course will be the splendid Hornby-Dublo L.N.E.R. "Pacific" Locomotive No. 4498 "*Sir Nigel Gresley*"; this is an accurate reproduction of the giant "A4" streamliners that are so well known on the East Coast Route. The locomotive is supplied with an eight-wheeled corridor tender representing the type developed for long non-stop runs, especially that of "*The Flying Scotsman*" between London and Edinburgh.

Articulated stock is also widely used on L.N.E.R. suburban trains so that the Hornby-Dublo Two-Coach Articulated Unit can be employed quite well for short-distance stopping trains, as suggested previously in these pages on various occasions. For such duties there is the handsome Hornby-Dublo Tank Locomotive. This has the 0–6–2 wheel arrangement, and very closely resembles the real "N2" class of tanks developed at Doncaster for the King's Cross and other L.N.E.R. local services.

Typical L.N.E.R. goods trains also can be run, both long-distance express freighters and the more ordinary local goods trains. Standard open wagons and covered vans in L.N.E.R. style are available, their designs representing the latest standard practice. Then there are vehicles for special traffic such as the Fish Van, the characteristic bogie Brick Wagon and the standard 12-ton High-Sided Coal Wagon. In the upper illustration on this page there is a fast freight train headed by the 4–6–2 "*Sir Nigel Gresley*" and made up of vans of various kinds running through a suburban station. This is a typical L.N.E.R. express goods in miniature, the vans carrying perishable and other important traffic being hustled along by a passenger engine. Such engines are often used nowadays in actual practice on freight duties. Their speed capacity is useful, and their employment in this manner between spells of passenger work is often of convenience in locomotive operation.

For local and "pick-up" goods trains, made up usually of a variety of vehicles, the 0–6–2 Tank Locomotive is ideal. Among interesting "pick-up" freight trains not often seen in miniature railway practice are those that are run for the purpose of collecting loaded wagons from various collieries or adjacent stations in coal-mining districts. For such a train on a Hornby-Dublo system the various Coal and High-Sided Wagons available are exactly what is required, each being provided with a load of dummy coal. A great deal of coal is dealt with on the L.N.E.R., so that this suggestion is quite a suitable one for a Dublo railway based on that system.

Brick trains, composed of the well-known bogie vehicles so accurately reproduced by the Hornby-Dublo High-Capacity Wagon, are a frequent sight on the L.N.E.R. Such vehicles should be run next to the engine.



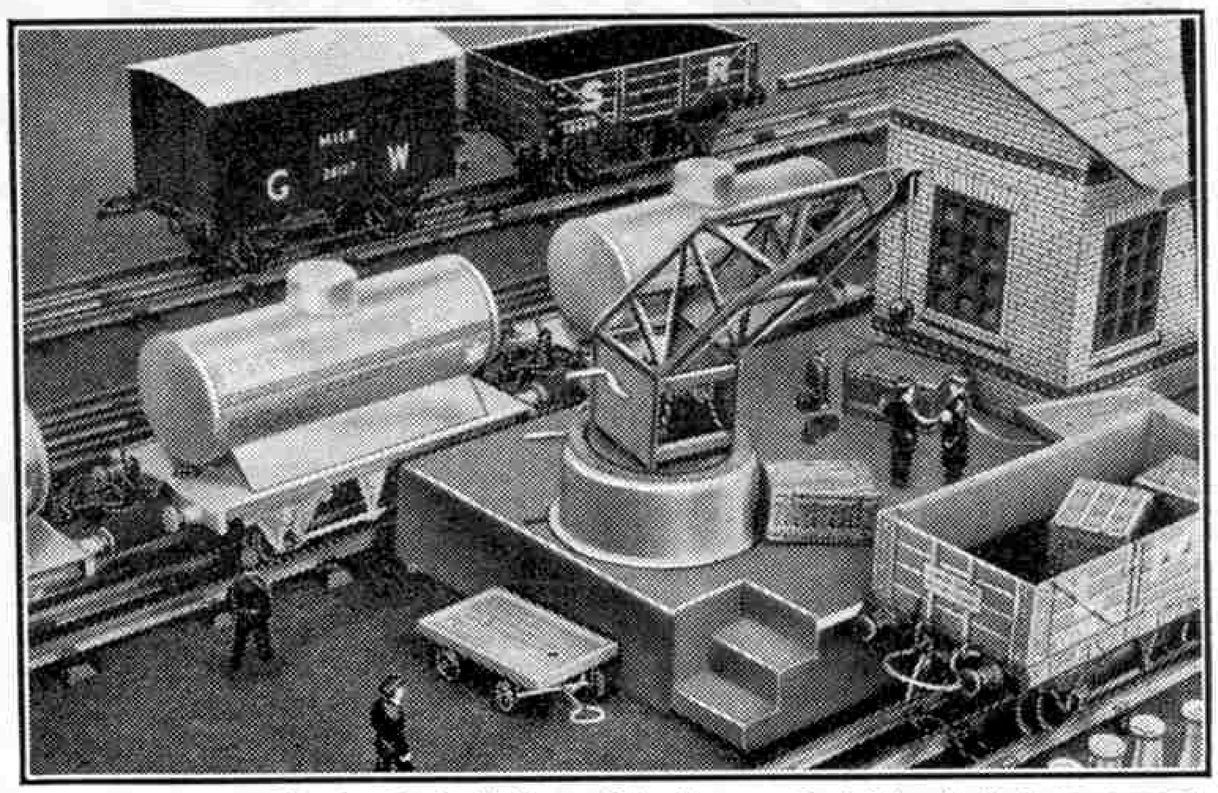
A typical scene at a main line passing station on a Hornby-Dublo L.N.E.R. system. Express and local trains are running alongside their respective platforms.

Some Novel Operating Schemes

ONE of the greatest attractions of the miniature railway hobby is the variety of interests that it presents. In addition there are nearly always variations in each phase of working, which adds considerably to the interest. In this article we touch on certain schemes based on actual practice that should appeal to readers who wish to introduce some novelty into their operations. Attention to these, added to the normal routine working, will be found to improve the realism and interest of operations.

There is a special attraction about train services that are run in connection with steamer sailings, whether these involve short distance cross-channel passages or ocean voyages. The inclusion of a miniature port as part of a railway system is desirable, but even a simple quayside with ships forming merely part of a painted background scene can prove very attractive and quite effective for working. When this is possible some famous trains of real practice can be run in miniature such as the *"Golden Arrow"* of the S.R. between Victoria and Dover, the "Irish Boat Expresses" of the G.W.R. between Paddington and Fishguard, the *"Hook Continental"* of the L.N.E.R. or the *"Ulster Express"* of the L.M.S. between Euston and Heysham.

Each of the services just mentioned connect with ships that sail more or less "narrow seas." There are in addition the *"Ocean Liner"* trains between Waterloo and Southampton Docks of the S.R. and the *"Canadian Pacific"* or *"Cunard-White Star"* services of the L.M.S. between Euston and Liverpool.

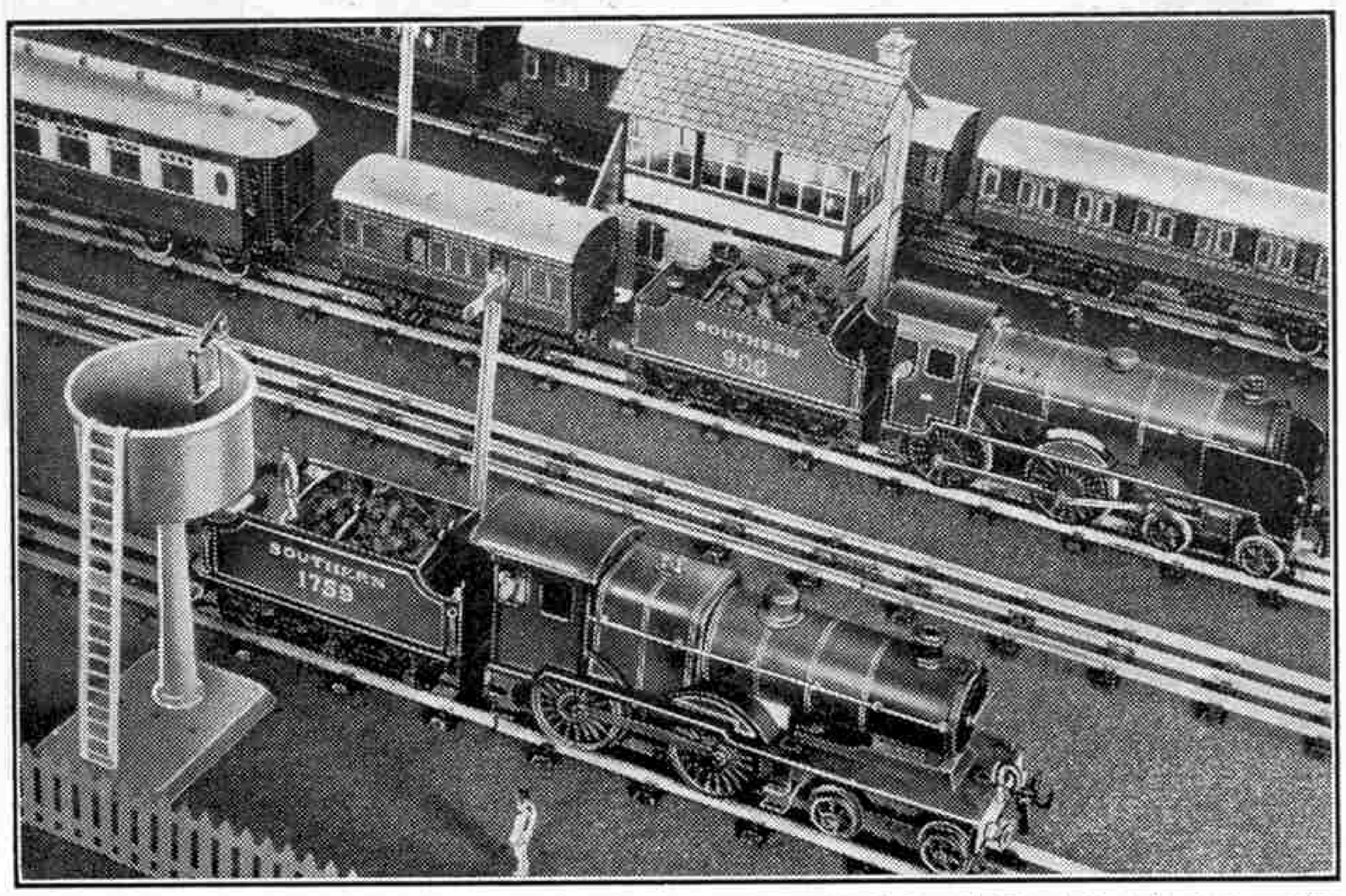


A busy scene at a Hornby Goods Platform. Note the use of miniature luggage to represent boxes of general merchandise conveyed in open wagons.

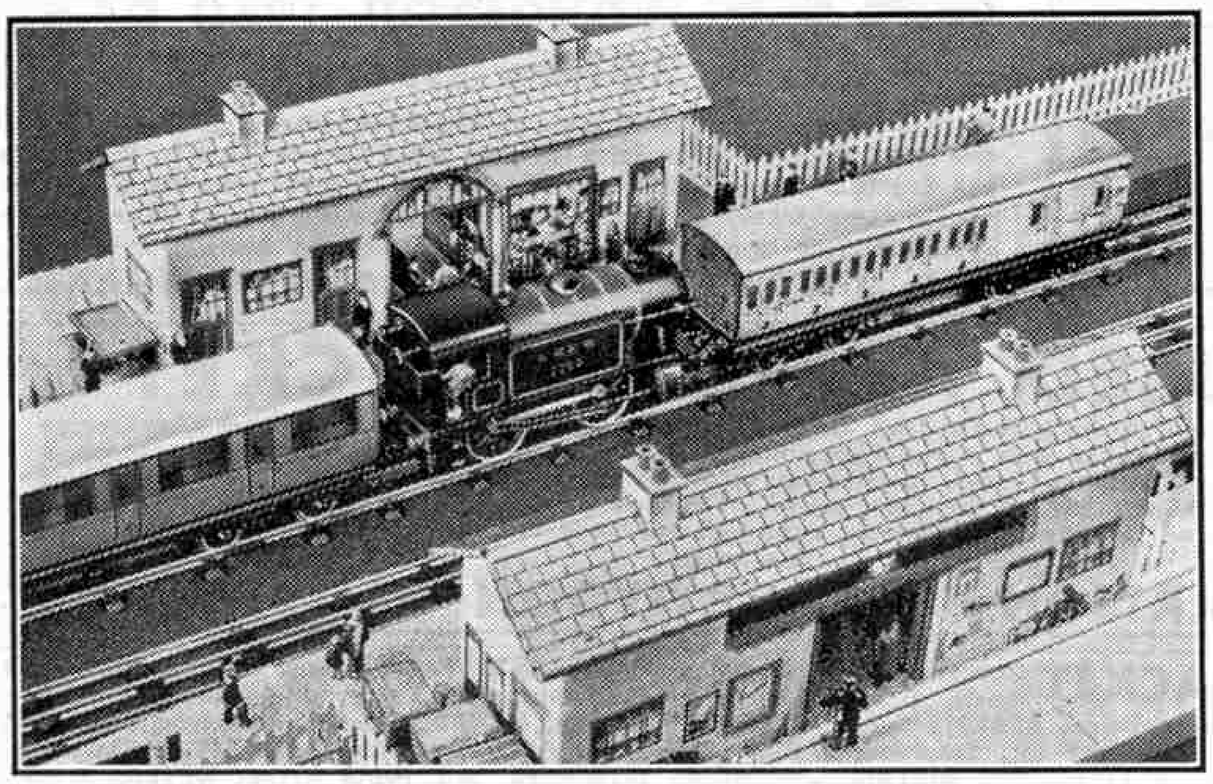
An interesting feature of certain boat train workings is the provision necessary for passengers' baggage. This sometimes involves rather curious combinations of vehicles in the make-up of the trains. For instance, in the lower illustration on this page a No. 1 Guards' Van is shown attached behind the tender of the engine of a Pullman train. The combination of the two types of stock, in their differing colours is interesting and makes the train distinctive. It recalls the frequent use in a similar manner of the "general utility" luggage vans of the S.R. that are seen quite frequently included in the composition of important trains. The train shown represents an *"Ocean Liner"* special in charge of a "Schools" class locomotive, the well known Hornby "Eton" model heading the train.

Special arrangements are made on the *"Golden Arrow."* This has attached to the tail of the down train and "inside the engine" on the up run, one or two flat trucks specially intended for the conveyance of the containers for registered baggage. A dummy container or "luggage box" of cardboard or wood carried on a Hornby Flat Truck could quite well be incorporated in the make-up of a miniature *"Golden Arrow."* The train could consist otherwise of Hornby Pullmans and No. 2 Corridor vehicles.

Methods of train working on miniature railways vary considerably, but most "General Managers" agree that timetable working, or at least some systematic method of operation, is far more realistic and enjoyable than the merely haphazard way of running one kind of train and then another. This invariably leads to the running of a series of frequent but light trains. This is the ideal method where clockwork engines are in use as the train loads can be restricted according to the haulage capacity of the different engines employed. Even though much heavier loads, as a rule, can be taken by electrically operated engines this system of operation can still be practised. Space indeed, sometimes makes the operation of long trains more or less impossible. Light trains of a few coaches or wagons are often run in



An S.R. "Ocean Liner" Pullman special on a Hornby layout. The No. 1 Guard's Van behind the tender of the "Eton" Locomotive is provided for some of the baggage that is so plentiful on boat trains.



A "push and pull train" at a wayside station. This method of working has many advantages in miniature; in particular it avoids the necessity for the engine running round its train.

practice when extra rolling stock is required at a station that has run short.

There is of course no reason why a specially heavy train should not be worked occasionally if traffic conditions make this necessary. This may necessitate, on a clockwork railway, the attachment of an assistant engine. On Hornby electric systems engines such as the splendid 4–6–2 "*Princess Elizabeth*" can take any load that is likely to be accommodated by the sidings or stations on a miniature line.

For suburban train working when only one operator is available, as is sometimes the case in miniature, the scheme of running "pull and push" trains is most effective. This means that a tank engine is used to haul its train of say two coaches in one direction but for the return journey the coaches lead, the engine then pushing its load. This avoids "running round" at terminal points and is economical in engine power; in addition it means that simpler layout arrangements are possible and this saves space.

Sometimes the engine is situated in the centre of the train as in the upper illustration on this page. Whichever method is adopted in actual practice special arrangements allow the engine to be controlled by the driver who rides in a special driving compartment, the fireman remaining on the footplate.

Either scheme gives a novel effect in miniature operations. When the engine is situated between the coaches there should be a brake-third vehicle at each end of the train, the guards' compartment accommodating the imaginary driver. A single brake-third is sufficient if the engine is always at one end of the train.

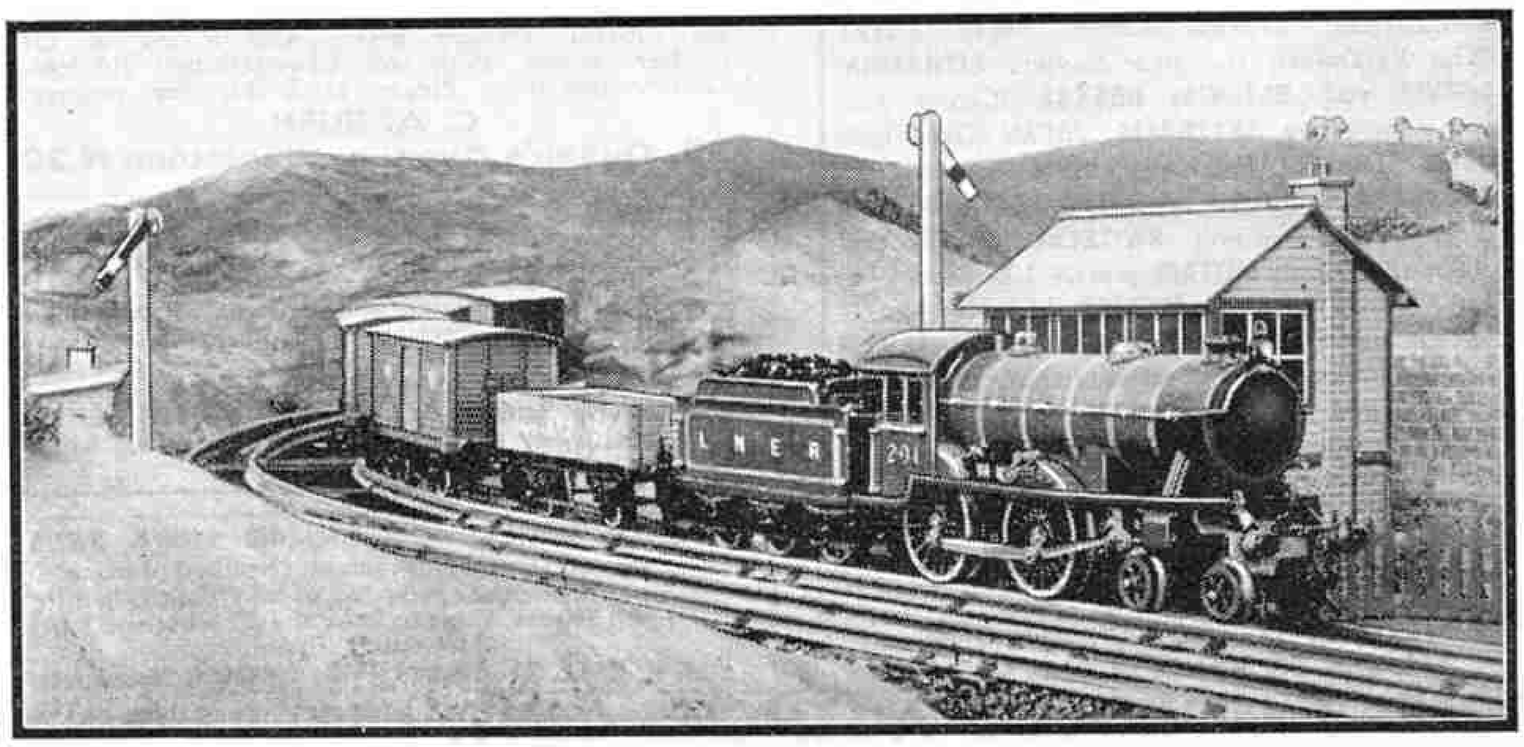
A phase of freight train working that is not always given the attention it deserves is the provision of actual loads for goods wagons and for giving a business-like appearance to the loading bank of the Goods Depot. These articles in the "*M.M.*" have frequently given hints on the methods of arranging various loads, apart from the use of the items already available in the Hornby Series. Hornby Miniature Bricks and Coal can be used effectively especially in connection with the No. 2 High Capacity Wagons for which they are particularly intended. Coal trains are a feature of operation on British railways and they can also form an important part of the traffic in miniature. In addition to the conveyance of coal for shipment and for ordinary uses the supply of coal for the railway's own engines should not be overlooked. The G.W.R. No. 2 High Capacity Wagons in fact has "Loco" marked on its sides, this indicating its particular purpose. One or two of those vehicles included in a coal train will give a most realistic touch, and in addition if they stand loaded near the Engine Shed they look extremely effective.

For the carriage of Hornby Bricks the No. 2 Special L.N.E.R. High-Capacity Wagon is the best vehicle to use. This represents in a most effective manner the real brick wagons that are so familiar on the main line between Peterboro' and London.

Then there are such trains as those operated for the conveyance of meat, fish, fruit and other perishables. Extensive use is made of containers for traffic of this kind. On a miniature system the Hornby G.W.R. and S.R. Containers are exactly what are required for perishable traffic. The L.N.E.R. Container is used more for general purposes and can be employed very well in a miniature "*3.35 Scotch Goods*," the running of which in actual practice was dealt with in the "*M.M.*" last month.

The L.M.S. Furniture Container, on its special Flat Truck of course, introduces a specially interesting suggestion. Readers will have heard of various spectacular removals of complete farms and other establishments from one part of the country to another. Furniture and household effects, livestock, machines and implements are all loaded up in appropriate vehicles on the one special train which is worked intact from start to destination. In miniature such an "omnibus" train could consist of, say one No. 2 Corridor Coach for the various people and staff, two L.M.S. Containers or Flat Trucks for their effects, several Cattle Trucks for the animals, an open Wagon or two for the farm implements and a No. 1 Guards' Van to complete the train and convey any "oddments." The various machines can be made up of Meccano Parts in many cases.

There is a special interest attached to the working of freight trains by express passenger locomotives. This is a regular practice of the four British main line railways in these days of standardisation of locomotives, and the need for economy in operation.



A goods train on a Hornby Railway hauled by an express passenger locomotive, as described in the accompanying article.

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Our "Bargain" Discount Approvals contain a fine general range of picked Modern and New Issues and Commemoratives, etc., from 1d—6d. each less a generous discount. Send to-day with confidence, as we do NOT send again unless requested. State whether you wish to see Br. Cols., Foreign, or both. Customers under 16 please obtain adult permission.

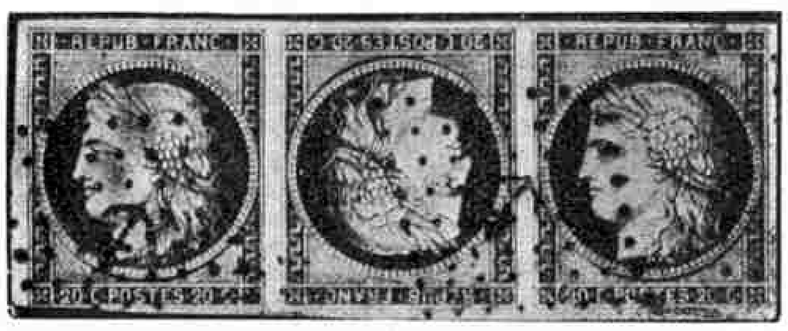
THE BIRKDALE STAMP CO. (P.T.S.)—POSTAL ONLY
Dept. M, 104, Liverpool Road, Southport, Lancs.

For other stamp advertisements see page xii

STAMP COLLECTING

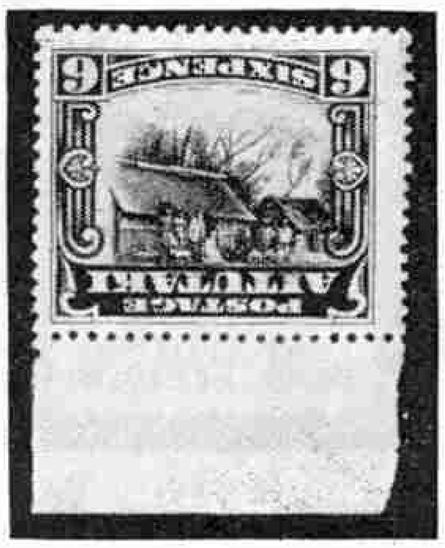
First Steps in Stamp Collecting

IT is probable that very many of our readers will take up the stamp collecting hobby this winter, and our article this month is intended to help the new collector to start his collection on right lines. He does not need elaborate equipment to do this. The only things that are necessary are an album, a packet of peelable mounts, a stamp catalogue and, most important of all, the stamps that are to form the collection.



A strip of the French issue of 1849-50, showing the middle stamp tete-beche, that is inverted in respect to the next stamps.

The album should be of the loose-leaf type in preference to one that has fixed pages for all the countries in the world. For reasons that we will mention later, most young collectors find that their collections tend to build themselves around a few countries only. Their fixed-leaf albums rarely provide sufficient space to accommodate all the stamps belonging to those countries, and pages for the stamps of other countries remain almost empty. On the other hand the loose-leaf album has blank pages that can be used as desired. The order of the pages therefore can be changed around, and additional pages can be inserted as desired. It is true that there are several excellent fixed leaf albums that provide spaces for every stamp that has been issued, but they are costly productions. Young collectors would be better advised to spend the bulk of their money on stamps rather than on unnecessarily elaborate equipment, and in every respect the loose-leaf album is better for them.



A 6d. stamp of Aitutaki's 1920 issue, showing the frame of the stamp inverted.

Peelable hinges are very important. They cost a penny or two more per thousand than the cheaper variety, but the extra coppers are well spent. Cheap mounts cling tightly to the album page and to the stamps and it is often impossible to remove stamps mounted with them from the album, to change the layout of a page for example, without damaging the stamp or the album, or both.

It should be remembered that not even a peelable hinge can be removed while it is still damp. If the position of the stamp has to be altered, leave the alteration until the mount is quite dry. It will then peel from the page and from the stamp without leaving a trace.

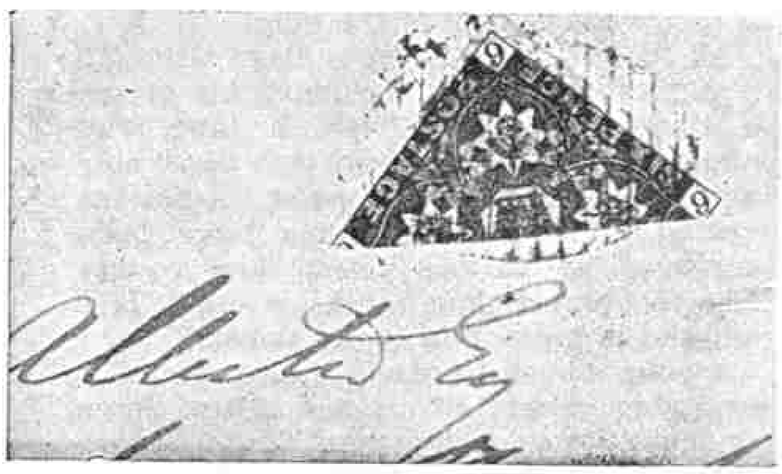
A good stamp catalogue is an essential. Indeed, to try to mount a collection of stamps without a catalogue as a guide to correct arrangement would be akin to sending out an aeroplane on a reconnaissance flight without maps to aid the navigator. Either the Gibbons' "Simplified" or the Whitfield King "Standard" catalogue is ideal for the beginner's purpose. Both concentrate on the essential varieties of stamps and list all that the young collector is likely to encounter. Each provides a complete series of illustrations that are invaluable in identifying stamps.

Most boys start their collections with a packet of stamps presented by an adult, and possibly they are fortunate enough to be asked what they would like the packet to consist of. In every case the answer should be: "The biggest mixed packet that you can get with the money you think of spending; but please be sure that it is an 'all different' packet, that is one in which every stamp is different." Such a packet provides the start of a really useful general collection around which later purchases can be built.

Some people advise young collectors to specialise in just a few countries right from the start. We disagree with this idea, although we are all in favour of developing the collection on specialist lines when the collector has passed out of the beginner stage. Nothing helps a boy to understand stamps and stamp collecting more quickly than to be allowed to roam at random among all the countries of the world.

Later acquisitions for the collection will consist of gifts of stamps from friends in offices. The more friends the better, for stamps each one gives will tend to be limited to those of a certain range of countries. A wider variety will be the result of having several sources of such gifts. Supplies from friends in offices will tend to dry up after a time, because fewer and fewer new varieties will be forthcoming. By this time the collection will be taking some sort of shape, however, and the collector will be able to form some idea of what is required to achieve a reasonable degree of completeness.

A collector of limited means cannot hope to approach completeness in all countries. This would involve collecting something like 60,000 different stamps, many of them of great rarity and obtainable only by spending large sums of money. The young collector therefore should try to make certain sections of his collection complete. He can do this by buying what are known as long sets of the countries that are weakly represented in his collection, and by buying single stamps to complete sets of the countries that are strongly represented.



A Nova Scotia 6d. stamp of the 1851 issue bisected and used as a 3d. value. Such pieces should be retained on their original envelopes. Above is a specimen of the 4d. 1851, Western Australian "Inverted Swan," the rarest of inverted varieties, in which the frame is inverted.

A long set may consist of a packet with 200, 300 or 500 stamps of a country. It offers the cheapest means of building up the general collection, even though the packet may contain a few stamps that duplicate specimens already present in the collection. The duplicates can be used for exchange purposes with other collectors, and "swapping" is great fun.

Purchases of single stamps can be made by sending to a dealer a "wants list," detailing the particular stamps required, or by purchase from a dealer's approval sheets. Approvals are sheets of stamps showing sets or single items, from which the collector can choose just what he wants and return the others. Just one word of caution is called for here. It isn't fair to keep the sheets a day longer than is absolutely necessary to select the stamps desired. Every dealer wants good customers, and when he has them he takes care to please them. His best customers are those who return approvals without delay.

A Rhodesia 1905 pair, 1/– value, imperforate between. When possible, sheet margins should be left attached to mint stamps. The rarities shown on this page are illustrated by courtesy of H. R. Harmer, London.

Stamp Gossip

and Notes on New Issues

Gum

Among collectors of long experience the gum on stamps is a "sticky" topic. Some think that it would be in the best interest of stamps that gum should be washed off mint specimens, because they believe that in time gum on the back of a stamp has an injurious effect; while others say that a stamp is no longer mint if any part of its gum is missing or disturbed. Extremists even insist that the presence of a mount on the back of an unused stamp takes away any claim to being a mint stamp. They place each unused stamp in a little transparent envelope and mount that "pochette," as it is known, in the album. The pochette is undoubtedly a good idea, quite apart from the gum question. It prevents the surface of the stamp being spoiled by rubbing against the album page, one of the quickest ways we know of destroying the bloom of a mint stamp.

When stamps were first issued in Britain there were many objections to what was described as the "filthy practice of licking these bits of paper," and some people were so fastidious as to insist on pinning the stamp to the envelope. Agitators went so far as to caution the public against the injurious and even poisonous effects on the human system that might be expected to follow the licking of the gum!

All those fears were groundless, although it must be said that the materials in use in those early days were a long way inferior in quality and purity to those now in use. To overcome popular objections scented and flavoured gums have been employed at various times, and to-day only the purest gum arabic is used. This material is present in many sweets.

As one comes to study stamp gums, a surprising variety of interest arises. Some countries use colourless gum, Great Britain being one instance of this. Canada uses a cream coloured gum, and there have been cases in which the gum was deep pink. The gum may be thick, or it may be thin, and over an issue that has been in use for a long period, wide variations may be found. These variations are of considerable help in sorting out the various printings of such an issue.

From a monetary aspect it is important that the gum should remain on the back of an unused stamp. When rare old stamps come into the market, O.G. specimens, that is those with full original gum, command much higher prices that those without.

There have been rare occasions when stamps have been issued without gum. One such stamp we know is the Japanese 1927 issue commemorating the 50th anniversary of Japan's entry in the Universal Postal Union. A serious earthquake had destroyed the Government printing shortly before the appearance of these stamps, which presumably were issued without gum owing to a shortage of suitable materials. We received a set of the four stamps from a Japanese reader at the time, and although we made enquiries into the absence of the gum, no official confirmation of our explanation was forthcoming. The catalogues do not mention that the stamps were issued without gum.

We thank David Field Ltd., 7, Vigo St., London W.1, for their courtesy in loaning the stamps from which the illustrations for this page have been made.

A Fine Australian Stamp

The departure of the second Australian Imperial Force has been commemorated in Australia by the issue on 15th July of four stamps, 1d., 2d., 3d., and 6d. values each bearing the design illustrated on this page. This shows representatives of the Australian Navy, Army, Air Force and Nursing Services.

Pony Express Commemorated

We illustrate this month the stamp recently issued in the United States to celebrate the 80th anniversary of the founding of the Pony Express, the famous mail service of the American prairies of the middle of the last century.

The design shows a Pony Express rider setting off with a pouch of mail from one of the express stations. In the upper corners are a cornsheaf and an Indian totem mask, symbols representing prairie conditions of to-day and 80 years ago respectively.

In a recent Stamp Gossip note we commented on the issues produced in the South American Republics and elsewhere to commemorate the jubilee of the Pan-American Union. Certain of these stamps are gaudy and unrestrained, but Paraguay has made an issue with a design worthy of the real dignity of the occasion. There are four stamps in this issue, each bearing the simple yet effective design illustrated here. The remaining values are 50 centavos, 5 and 10 pesos.

* * * *

Russia's military coup of September last, when she annexed part of the Ukraine is made the topic for an issue of two commemorative stamps. We illustrate the 30 kopecks value, which depicts Russian troops of an armoured division being welcomed by the Ukrainian population. The heavy tank shown in the background is the first shown in a stamp design.

* * * *

A popular recent design is the Egyptian issue for Child Welfare charities showing a portrait of the 18-months old Princess Feriol, illustrated on this page.

The New Season's Catalogues

"Stanley Gibbons' Priced Catalogue of the Postage Stamps of the World" Price 18/6 net. Also issued in parts. Part I (British Empire), 7/6; Part II (Foreign Countries), 11/6. (Stanley Gibbons Ltd., 391, Strand, London W.C.2.).

Every stamp collector should make use of an up-to-date stamp catalogue, which guides him in arranging his stamps and helps to solve most of the problems connected with the hobby. The 1941 edition of "Gibbons" is fully up to the standard of previous issues, in spite of difficulties that wartime has brought with it, and there has been the usual thorough revision, with 24,463 price alterations and particulars of 2,030 new issues. The tendency of prices of course is upward, due largely to the keen all-round demand, which is particularly marked in British Empire and European issues.

Readers who wish to possess a copy of this invaluable catalogue should place their order now, as the wartime paper shortage has made it necessary to print fewer copies.

"Stanley Gibbons' Simplified Stamp Catalogue" Price 6/6 net (Stanley Gibbons Ltd., 391, Strand, London W.C.2)

This well-known catalogue, now in its 9th edition, differs from the larger "Gibbons" in omitting errors and varieties, and in not referring to such matters as watermarks, perforations and shades. Thus it concentrates on the stamp itself, and will meet the needs of the general collector who is not particularly interested in these details. The present edition is thoroughly revised, giving details of 1,799 new stamps and 18,684 price alterations.

"Whitfield King's Standard Catalogue of Postage Stamps." Price 6/6 net. (Whitfield King and Co., Ipswich).

The 40th annual edition of this standard catalogue is larger than ever, containing nearly 1,000 pages and more than 7,800 illustrations. The number of new stamps added since the publication of the last edition is 2,113, bringing the number included to 71,222.

COMPETITIONS! OPEN TO ALL READERS

Feature Voting Contest

Now that the number of pages in the *"M.M."* has had to be reduced owing to the shortage of paper it has become difficult to find room in it for all the features that have proved so popular with readers. It is a great help to know which of the regular features of the Magazine make the greatest appeal to our readers, and for our competition this month therefore we are asking them to take part in a simple voting contest with these features as their subject.

In the panel on this page is a numbered list of the features concerned. Readers are asked to send postcards on which they have indicated first the one that they like best of all, and then have selected the 10 most popular in the order in which they think they will be placed by the massed votes of all the competitors. It is not necessary for a competitor to head his list with his own favourite feature, unless he believes that it will prove to be the general favourite.

There will be two sections, for Home and Overseas readers respectively, and in each four prizes of products manufactured by Meccano Ltd., to the value of 21/–, 15/–, 10/6 and 5/– respectively, will be awarded to the competitors whose lists most closely approximate to that based on the general voting. In the event of a tie the judges will take the neatness or novelty of the entries concerned into account.

1. **Air News.**
2. **Books to Read.**
3. **Competition Page.**
4. **Engineering News.**
5. **Fireside Fun.**
6. **From Our Readers.**
7. **Model-Building Contest Results.**
8. **New Meccano Models.**
9. **Photography.**
10. **Railway News.**
11. **Stamp Collecting.**
12. **Suggestions Section.**
13. **With the Model-Builders.**
14. **Of General Interest.**

Entries should be addressed *"Feature Voting Contest,* Meccano Magazine, Binns Road, Liverpool 13." The closing date in the Home section is 31st October, and that in the Overseas section is 31st January 1941.

This contest is open to every reader of the Magazine, and in view of the value of the information that the entries will give we want every *"M.M."* enthusiast to send us a postcard showing what he thinks on this topic. The conditions are very simple, and little time will be needed to prepare the entry, so that everyone should find ample time in which to take part.

COMPETITION RESULTS

HOME

July Doublets Contest.—1. N. Murray (Liverpool); 2. T. Hill (Bolton); 3 and 4 equal. E. Moss (Church), J. Parkinson (Accrington) and J. Hindle (Baxenden). Editor's Special Prize: R. A. J. Burn (Portsmouth).

July Photographic Contest.—First Prizes: Section A, A. Audsley (Cobham); Section B, P. G. Lund (Leicester). Second Prizes: Section A, R. D. Barrett-Lennard (Cressing); Section B, Cecil P. Wareham (London N.W.6). Consolation Prizes: E. Richardson (West Bridgford); D. T. Stott (Rochdale).

August Photographic Contest.—First Prizes: Section A, G. B. Montgomery (Castle Douglas); Section B, K. Richmond (March). Second Prizes: Section A, A. S. McDonald (Giffnock); Section B, D. Glen (Barking). Consolation Prizes: W. Barr (Birkenhead); E. Richardson (W. Bridgford); R. H. Wackerbarth (Sheffield); P. Cooper (Felixstowe).

August Howlers Contest.—1. T. Hill (Bolton); 2. J. W. Wright (Newark-on-Trent); 3. J. C. Bray (Sheffield 10); 4. R. L. Williams (Bournemouth). Consolation Prizes: M. C. Penney (Aviemore); E. W. Bond (Birmingham 21).

OVERSEAS

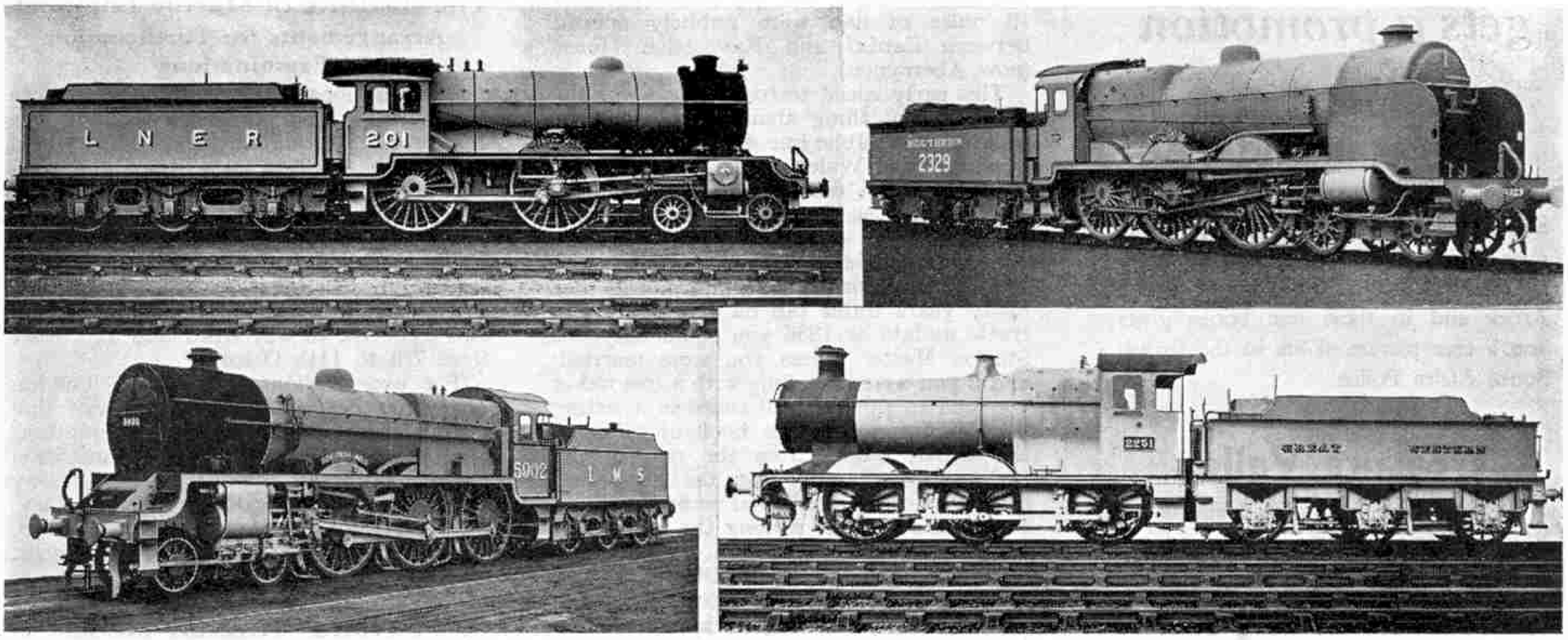
April Hidden Titles Contest.—1. W. Hyland (New Zealand); 2. T. A. Wade (Johannesburg, S.A.); 3. W. C. Coles (Cheltenham, S. Australia); 4. L. S. Osborne (Victoria, Australia). Consolation Prizes: W. Bradfield (Levin, N.Z.); I. P. Raol (India).

April Photographic Contest.—First Prizes: Section A, K. Warman (Cape Town, S.A.); Section B, H. Ekwensi (Nigeria). Second Prizes: Section A, A. C. Peterkin (Barbados, W.I.); Section B, S. Jakobsen (South Africa).

May Photographic Contest.—First Prizes: Section A, R. Willie (Cape Town, S.A.); Section B, R. Jones (Montreal). Second Prizes: Section A, L. W. Humm (New Zealand); Section B, N. Adams (Sydney, N.S.W.).

May Advertising Slogan Contest.—1. W. Johnston (Wellington); 2. C. H. Robinson (Ashburton, N.Z.); 3. F. J. Harrison (Southern Rhodesia); 4. A. Williams (Vancouver, B.C.).

LOCOMOTIVE DESIGNING CONTEST



The illustration on this page shows four locomotives, an L.N.E.R. "Hunt," *"The Bramham Moor,"* S.R. *"Remembrance,"* L.M.S. "Patriot" class, *"Sir Frank Ree,"* and a G.W.R. 0–6–0 tender engine. We ask competitors to design for us an engine that will include what they consider to be the best features of these four engines.

This contest is not restricted to members of the H.R.C., but is open to all readers. In each section, Home and Overseas, there will be prizes of any Meccano products to the values of 21/–, 15/– and 10/6 respectively. Envelopes should be addressed *"Designing Contest, Meccano Ltd., Binns Road, Liverpool* 13," and the closing dates are 31st October in the Home Section, and 31st January 1941 in the Overseas Section. Drawings must have the name, address and age of the sender clearly written on the back. The ages of competitors will be taken into account by the judges, and in the event of a tie a decision will be based on the neatness or novelty of entries.

H.R.C. COMPETITION RESULTS

HOME

August Engine Name-Building Contest.—1. J. H. Tait, Corstorphine, Edinburgh. 2. D. B. Blackburn, Minehead, Somerset. 3. J. McCann, Wallasey, Cheshire.

August Names Contest.—1. F. Mills, Kearsley, Nr. Bolton. 2. A. Elvey, New Eltham, London S.E.9. 3. E. F. Jones, Nantwich, Cheshire.

OVERSEAS

May Locomotive Progress Contest. — 1. F. J. Harrison, Bulawayo, S. Rhodesia. 2. D. Murison, San Andres—F.C.C.A., Argentina. 3. D. Price, Auckland, New Zealand.

A Mile in 7.7 Seconds

The least time in which a distance of a mile has been covered by a human being is 7.7 sec. which corresponds to a speed of 468.94 m.p.h., the record claimed for a flight in a Messerschmitt that was specially fitted for an attack on the speed record. The corresponding time for travel on land is about 10 sec., the time required for Captain Eyston to cover a mile on the Bonneville Salt Flats in his speed car *"Thunderbolt."* On water Sir Malcolm Campbell holds the record. He covered a distance of a mile in just under 28 sec.

It is interesting to compare these times with those achieved in other ways. For the motor cycle we find that the record for a mile from a standing start is 33.8 sec. while the time for a kilometre from a flying start works out at 21.1 sec. for the mile. For steam locomotion the record is held by the L.N.E.R. engine "Mallard," which travelled at the rate of a mile in 28.8 sec. Cycling of course is slower, even with a flying start and motor cycle pacing, and the least time in which the mile has been covered in these conditions is 41.4 sec. When we come down to human effort alone, in running, we find that the time required for a mile has lengthened out to 246.4 sec., that taken by S. C. Wooderson, the famous British miler when creating his world's record. The shorter distance of 100 yards has been covered in 9.4 sec., and if a human being could keep this rate up for a longer period he would require 165.4 sec. to travel a mile. The shortest time in which a distance of a mile has been walked is 381 sec., the achievement of P. Bernhard, a Latvian.

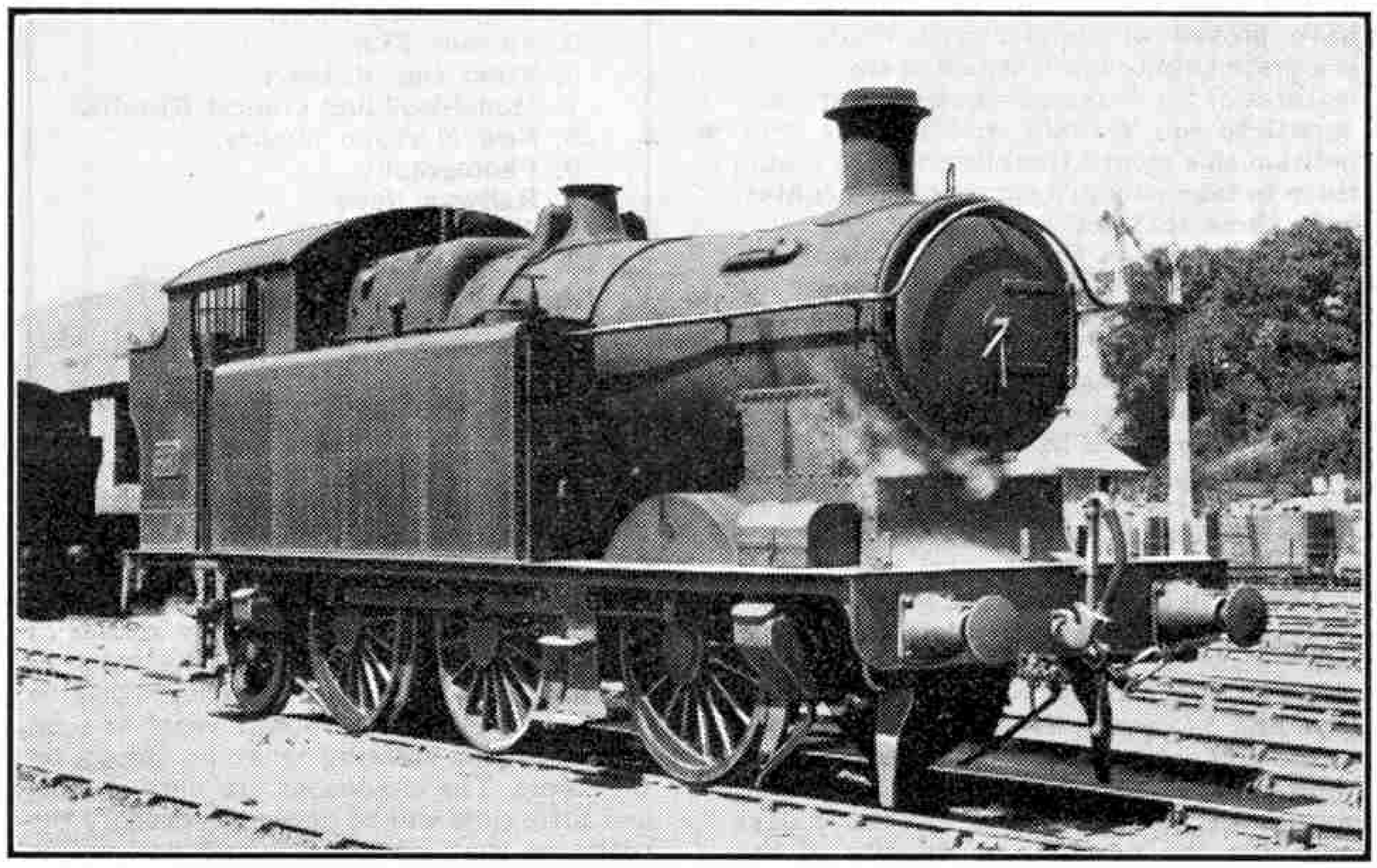
An October Centenary

Sixty miles an hour, the maximum permissible speed on British railways under war conditions, seems a leisurely enough rate of progress to railway enthusiasts accustomed to the ultra-high speeds of pre-war "streamliners." But the Taff Vale Railway, the centenary of which occurs this month, actually had its speed limited by law to 12 m.p.h. It celebrated the restriction (afterwards repealed) by attaining a reputed speed of 40 m.p.h. with the special train that conveyed an official party from Cardiff to Pontypridd and back on 8th October 1840, the day before the first 16 miles of line were publicly opened between Cardiff and Navigation House (now Abercynon).

This early speed restriction was not the only unusual thing about a railway that was the first public line of any commercial importance in Wales; which later grew up to operate the densest mineral traffic in the British Isles, if not in the whole world; and which at one time earned enough money from South Wales industry to pay 17½ per cent. on its ordinary stock. For many years trains ran on the right-hand track; as late as 1856 you could not be a Station Master unless you were married; and if you were travelling with a free ticket you had to ride ("at all times in a sitting position," to quote the book of rules) in the fourth wagon from the rear of the train—not necessarily from the brake van, as it was often considered unnecessary to run such a vehicle! Among the interesting features of a railway whose original main line was laid out by I. K. Brunel may be mentioned a mineral branch in the Rhondda Valley having an incline of 1 in 13 worked by special locomotives, assisted by balancing; also the employment, in common with other South Wales Railways, of the "somersault" type of signal first introduced on the Great Northern Railway.

Although the Taff Vale Railway has for over 18 years formed an integral and important part of the Great Western system, approximately 100 out of its total stock of 274 locomotives are still in service, mostly rebuilt with Swindon-type boilers and fittings, in addition of course to being renumbered.

D. S. BARRIE.



The most modern type of Taff Vale Railway locomotive rebuilt with Swindon-type boiler and fittings: G.W. 0-6-2T No. 337, formerly T.V.R. No. 10 of Class A, built by Hawthorn, Leslie in 1914. Photograph by D. S. Barrie.

Mud at Work

Without mud deep oil wells could not be drilled. The mud used is a mixture of water with a powdered material such as gypsum, to which various chemicals are usually added. It has to be kept moving all the time, down through the drilling pipe, out at the bottom where the bit is at work and up to the surface again, lubricating the pipe and bringing up cuttings, and its condition is watched throughout with the greatest care.

The Institute of Marine Engineers

Arrangements for Forthcoming Examinations

Examinations for admission to Associate Membership and Graduateship of the Institute of Marine Engineers will be held from 19th to 26th May 1941. The Institute's examination for admission of Students is discontinued, the Council having adopted in lieu the Common Preliminary Examination of the Engineering Joint Examination Board. Two of these examinations will be held in 1941, one from 1st to 5th April and the other from 7th to 11th October.

The examinations are held in London and other centres in Great Britain. Full particulars of the syllabuses, exemptions allowable, copies of previous examination papers and latest application dates, may be obtained on application to the Secretary, The Institute of Marine Engineers, 73, Amersham Road, High Wycombe, Bucks.

"Skybird" Aircraft Models

The latest addition to the popular series of aircraft models to the scale of 1 in 72 produced by our advertisers A. J. Holladay and Co. Ltd., is a miniature of the Hawker "Henley," a two seater light bomber. The necessary kit for building this is supplied complete with details of construction, performance, etc., and with scale plan drawings, and is excellent value for 3/6.

In the "Skybird" series of scale model accessories there are several new features, which include anti-aircraft guns, searchlights, sound locators, sandbag defences, Bren machine guns and figures. There is also a 6 in. field howitzer with Scammell gun tender.

Readers may obtain a complete price list free of charge on application to "Skybirds," 3, Aldermanbury Avenue, London E.C.2, enclosing 1½d. for postage. The *"M.M."* should be mentioned when writing.

Trooper Useless gets a promotion

Trooper Takes Command

Here is a new story, just as exciting and even more fascinating than the previous ones, *Trooper Useless* and *Not So Useless*. **L. PATRICK GREENE** knows South Africa and in these fine books gives you a true picture of life in the British South Africa Police.

Treasure Valley

is a brand-new tale of adventure in Rhodesia, by the same author.

Each 5/- net

CHILDREN OF THE SUN

A cheap edition of FRANKLYN KELSEY's story of Jim Armitage, Conky and Shorty in the Matto Grosso, is ready. (4/- *net*)

TOMMY HAWKE AT SCHOOL

Don't forget MICHAEL PATRICK's latest story of the boy detective. (4/- *net*)

HARRAP BOOKS

THE MECCANO MAGAZINE

R·A·F
RADIO FUND

★

A Message from the Editor

The object of this Fund is to provide portable radio sets for the isolated units of the R.A.F., who are in urgent need of this means of keeping in touch with current events and hearing the programmes of the B.B.C. These units, which include the Observer Corps and outlying detachments of all kinds, are on watch unceasingly, day and night, for enemy activities. The conditions in which they work cut them off almost entirely from any form of amusement, and their off-duty hours are apt to become very monotonous. For these units a radio set will come as the most welcome of all gifts.

The Fund is in direct association with the R.A.F. Comforts Committee, and all money received will be forwarded to this Committee *without any deduction whatever for working expenses*. The Committee will buy suitable radio sets, and distribute them where they are most needed.

I appeal to every one of you to look on this Fund as your own special way of making things more cheerful for the men of the R.A.F. Tell your parents, uncles and all other relations about the Fund, and gather in their subscriptions.

THE EDITOR.

Up to 1st August the sum of £95 had been sent to the R.A.F. Comforts Committee, and with this money the Committee had purchased and issued to R.A.F. units 21 portable wireless sets.

Last month we sent the Committee a further cheque, for £15, bringing the total amount sent to £110.

Have YOU sent a donation?

Fourth List of Donations

	£	s.	d.
Previously acknowledged	95	2	6
Barras E., Richmond	0	2	0
League of Model Science, Birmingham 9, per D. F. Felton	0	1	6
Endecott D. S., Appleton-le-Moors ...	0	2	0
Islington M.C. and Branch, H.R.C. ...	0	2	0
Anon., Edinburgh	0	1	0
Huntington R., Preston (7th contribution)	0	2	0
Great Baddow M.C....	1	1	0
Gamble M. R., Repton, Derby	0	1	0
Blackpool North Shore Branch, H.R.C. ...	0	5	0
Acton M.C. and Branch, H.R.C. (3rd contribution)	0	2	6
Logan R. J., Carnwath	0	2	6
James J., Sithney, Nr. Helston	0	10	0
MacMillan A. G., Caldy	0	5	0
Hess L., London N.9.	0	4	0
Cornick J., Weymouth	0	0	6
Gosling Heather, Luton	0	2	6
Fairley M. J., Sunbury-on-Thames ...	0	1	0
Smout J. M. and brother, Lapworth ...	0	3	0
Justice D. J., Hackbridge	0	4	0
Bomford P. R., Drayton	0	0	6
Oglethorpe E. W., Northwood (2nd contribution)	0	6	0
Kinglassie Branch, H.R.C. (2nd contribution)	0	13	0
Hornsea M.C.	0	5	0
Bond K., Birmingham	0	0	6
Simonson D. and J., London N.14 ...	0	1	3
Aldridge E. G. and C. W., London N.W.8 (3rd contribution)	0	2	6
League of Model Science, Birmingham 9, per D. F. Felton (2nd contribution) ...	0	1	3
Carmarthen Branch, H.R.C.	1	0	0
Edwards T., Weston-Super-Mare	1	0	0
Lee L., Cleveleys	0	1	0
Brackenbury M., Norwich	0	1	0
Graham M., Amersham	0	2	6
Abbott D. A. de G., Gloucester	0	2	6
Hinmers J. W. R., Buxton...	0	1	0
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FIRESIDE FUN

LOOKING AHEAD

Mother: "Why did you give Tommy Smith your nice new ball, Bobby?"

Bobby: "He promised to let me be Secretary of the Navy when he becomes President of the United States."

* * * *

Dashing into the office in a great hurry, a man shouted: "Quick, the police are after me. Where can I hide?"

"Get in the filing cabinet. Nobody can ever find anything there," said the boss.

* * * *

Haughty Housewife: "Aren't you the same man I gave a piece of mince pie to last month?"

Tramp (bitterly): "No mum, I'm not, and wot's more, the doctor says I never will be."

* * * *

Doctor: "Did you follow my advice to count until you fell asleep?"

Patient: "I counted up to 5,000."

Doctor: "And you then fell asleep?"

Patient: "No; it was time to get up."

* * * *

Teacher (to class): "What is an octopus?"

Small Boy (who had just commenced to take Latin): "Please, sir, it's an eight-sided cat."

* * * *

Chatting with her next-door neighbour, Mrs. Brown remarked: "We had such a row this morning. Didn't you hear it?"

"No, what happened?"

"Well, you see, my husband is fond of a dish of cornflakes for breakfast, but I gave him soap flakes by mistake."

"Was he mad?"

"Oh, simply foaming at the mouth."

* * * *

Customer: "Give me two pork sandwiches to take out."

Waiter (calling to cook): "Dress up a couple of grunts to go bye-bye."

* * * *

Farmer (on telephone to police at next town): "A blue motor car passed here, killed a cow containing four gentlemen and two greyhounds, one of which was a clergyman with no licence."

* * * *

Prison Visitor (to convict sewing mail-bags): "Ah! Sewing?"

Prisoner: "Naw, reaping."

* * * *

An American was telling an Irishman: "The fish are so numerous in one river in the States that the folks there just drop a pail into the water and pull it out full of fish."

"Well, now," said Pat, "do you know that in the River Liffey, in Ireland, if the people want a pail of water they have to push all the fish out of the way before they can get the pail in?"

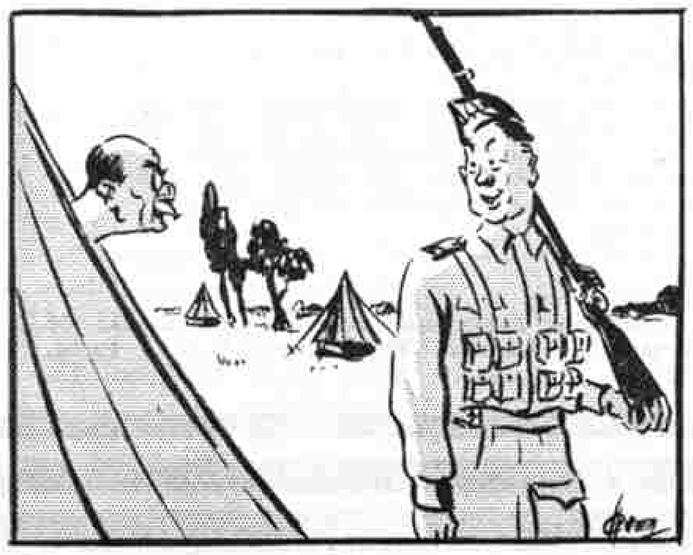
* * * *

Benevolent Lady: "My good man, don't you think fishing is a cruel sport?"

Fisherman: "Cruel? I should say so. I have sat here six hours, and have not had a bite; but am nearly eaten up by flies, and the sun has roasted the back of my neck."

* * * *

WHO'S WHO



Colonel: "Who are you?"

New Guard (from north of the border): "Fine, thank ye. Hoo's yersel?"

THE HANDY MAN

Two navvies settled down to eat their dinner. One began unwrapping a large parcel at which the other stared in surprise.

"Wot's that?" he asked.

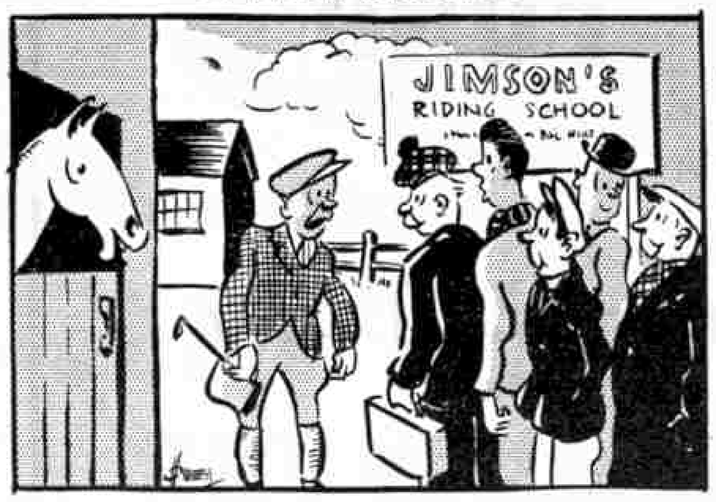
"Well, it's like this. My missus is away so I thought as I'd make myself a pie."

"Bit long, ain't it?"

"Oh, I dunno, it's rhubarb."

* * * *

A FIVE SEATER



Mac.: "I want to hire a horse."

Groom: "How long?"

Mac.: "The longest you've got. There be five of us going."

* * * *

"Do you believe it is unlucky for thirteen to sit down at table?"

"Certainly, if there's only enough dinner for twelve."

* * * *

"Are you positive," demanded counsel, "that the prisoner is the man who stole your car?"

"Well," answered the witness, "I was until you cross-examined me. Now I'm not sure whether I ever had a car at all."

* * * *

The doctor met Mrs. Brown on the street. "How is your husband now?" he asked. "Did you give him the sleeping potion?"

"Yes," she replied. "You told me to give him the amount I could get on a shilling, but as I didn't have one, I used 12 pennies, and he's been asleep now for four days."

* * * *

Young Son: "I say, Dad, if I plant this pip will an apple-tree grow?"

Father: "Yes, old boy."

Young Son: "That's funny; it's an orange pip."

* * * *

He had worked on the farm nigh on sixty years, and was busy one day at his usual tasks when the farmer went to him and suggested it was time he finished with work.

"Say," said the old man, "Sithee here, I've worked for thi' two grand-dads an' thi' fayther, an' lastly for thee. "If," he added, "I knew job weren't to be permanent a' wouldn't a' takken it on!"

* * * *

"What is the best method to prevent the diseases caused by biting insects?"

"Don't bite the insects."

* * * *

Barber: "Haven't I shaved you before, buddy?"

Soldier: "No, I got that scar in France."

* * * *

A boxer, hurrying to catch a train, had his foot trodden on by a passerby. Seizing the offender by the collar, the pugilist looked him up and down.

"Look 'ere, you!" he snorted at last. "For two pins and 50 per cent. of the purse, win or lose, and me naming the referee, I'd knock yer blinkin' 'ead off!"

* * * *

Cinema Attendant (to young evacuee): "Where's your gas mask?"

Evacuee: "I've forgotten it, mister."

Attendant: "Sorry, lad, but you can't see this picture without a gas mask."

Evacuee: "Lummy, is it as bad as that?"

* * * *

THIS MONTH'S HOWLER

A herbaceous border is another name for a vegetarian lodger.

OUR MACHINE AGE

The little town boy was offered a week's holiday in the country, but he refused. Coaxing, pleading and arguing brought nothing but the stubborn answer, "No country for me."

"But why?" he was asked.

"Because," he replied, "they have thrashing machines in the country, and it's bad enough here when it's done by hand.

* * * *

Policeman: "How did you get up that tree?"

Tramp: "Ain't you got no sense? I sat on it when it was an acorn."

* * * *

"At any rate there's one advantage in having a wooden leg," said Old Giles, the village optimist.

"And what's that?" asked a friend.

"Well, yo' can keep one sock up wi' tacks instead of 'aving to buy a garter."

* * * *

Policeman (to bystander): "How did this man come to get run over?"

Bystander: "He stopped in the middle of the safety zone."

* * * *

Aberdeen Butcher (to lady who has just bought a quarter-pound of beef): "There's a bit of suet to ye for naething, madam."

Aberdeen Lady: "That's rale kind o' ye. I'll no' bother wi' the beef noo."

* * * *

"What is it that fine feathers make, Tommy?"

"I don't know, teacher."

"Oh, yes, you do know. Now think—fine feathers make fine —"

"I really don't know, teacher."

"Yes, you do, Tommy. It begins with the letter 'b'."

"Oh, yes—beds, teacher."

* * * *

Sambo: "If yo' had five dollars in yo' pocket, what would yo' do?"

Pompey: "Ah'd think ah had somebody else's trousers on."

* * * *

Tom: "You couldn't lend me a fiver till to-morrow, could you?"

Dick: "What a thought-reader you are!"

* * * *

The family was having tea. Dick, looking round the table, saw that a nice chocolate cake was at the farthest end.

Standing on his chair, he was reaching for it when his father said, "Dick, haven't you got a tongue?"

"Yes, Dad," replied Dick; "but it won't reach so far."

* * * *

A nervous traveller in South America was anxious to bathe but before doing so he approached the attendant.

"Are there any alligators here?" he asked.

"No suh, no 'gators hyar."

"You're sure?"

"Yes, suh, quite suah."

"What makes you so sure there are no alligators here?"

"De sharks hab chased dem away."

* * * *

"Riches," said the teacher, reading to his class, "'take unto themselves wings and fly away.' What kind of riches does the writer mean?"

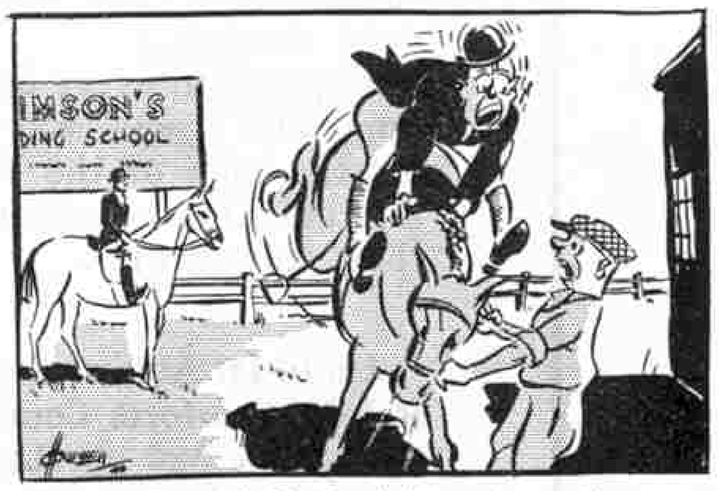
Blank looks met his gaze.

"Surely someone can answer a question like that. You, Brown, what kind of riches did the writer mean?"

Brown hesitated for a moment and then plunged: "Ostriches, sir."

* * * *

TAIL END



Pupil: "Let go! You're holding down the wrong end!"

* * * *

"And now you're in the Militia, what would you like to be?" asked the sergeant.

"If you please—an ex-service man!" was the reply.

* * * *

The explorer was relating his experiences for the press. "We ate our rubber boots," he said.

Reporter: "Provisions ran out, eh?"

Explorer: "No, but I thought it might add interest to your report."

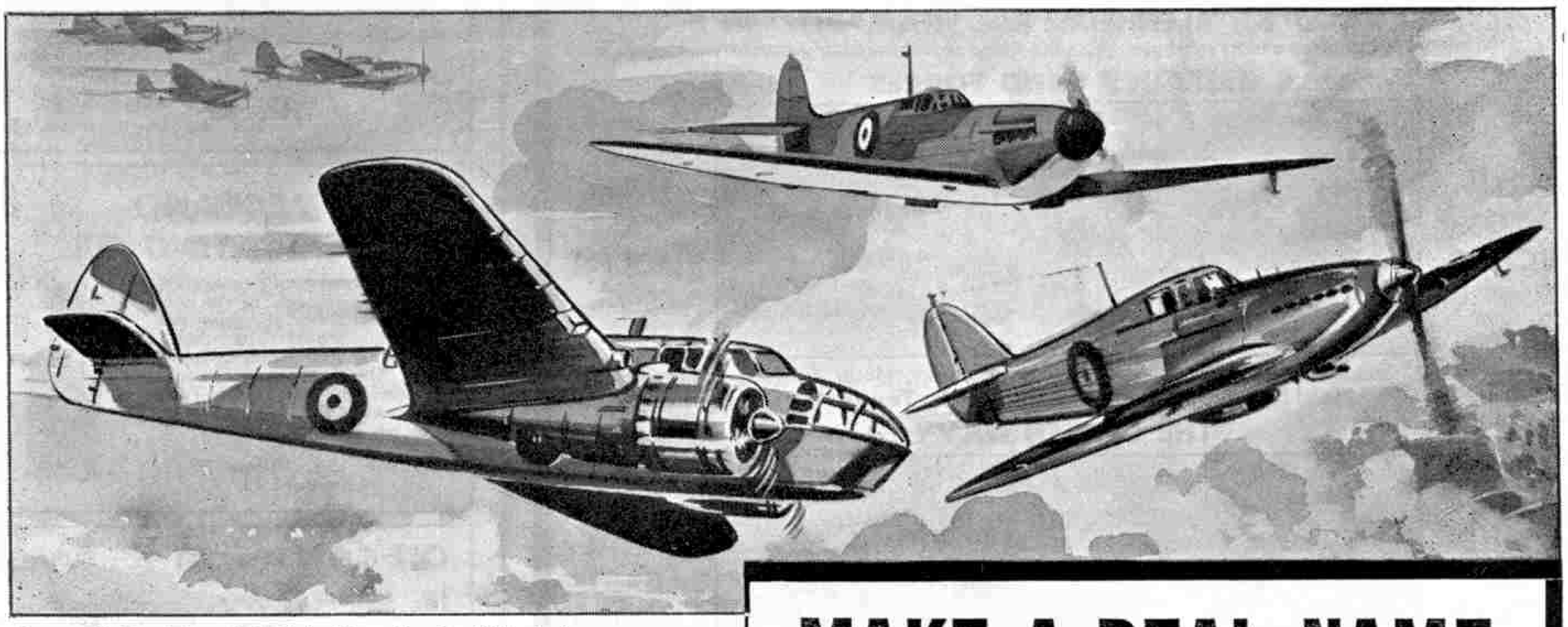
* * * *

First lunatic (with hands behind his back): "Guess what I've got in my right hand."

Second lunatic (after deep thought): "A traction engine."

First lunatic (furiously): "Oh, you looked."

JUNEERO's LATEST!



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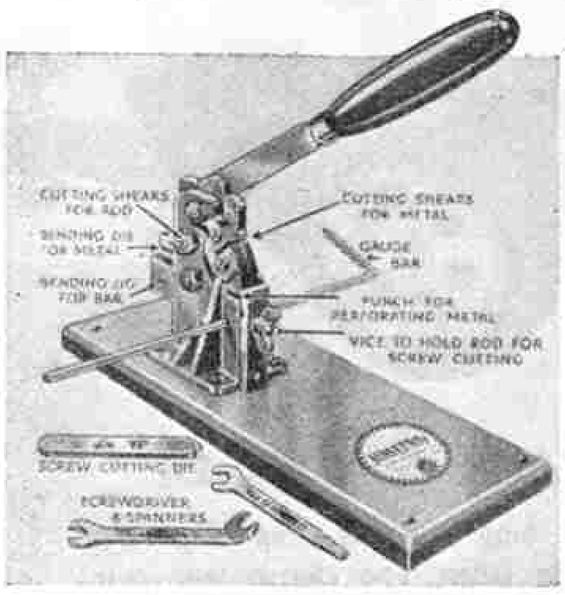

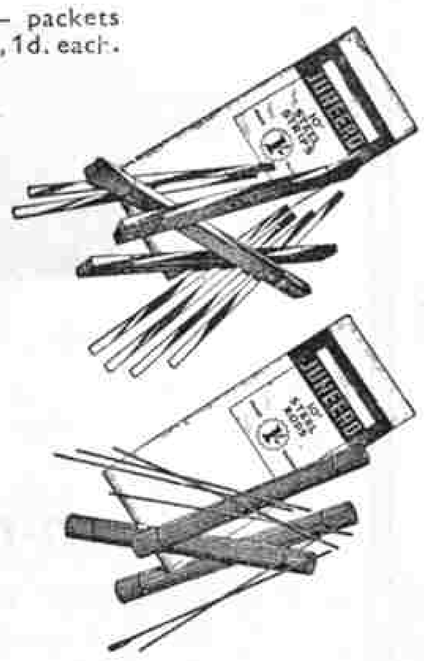

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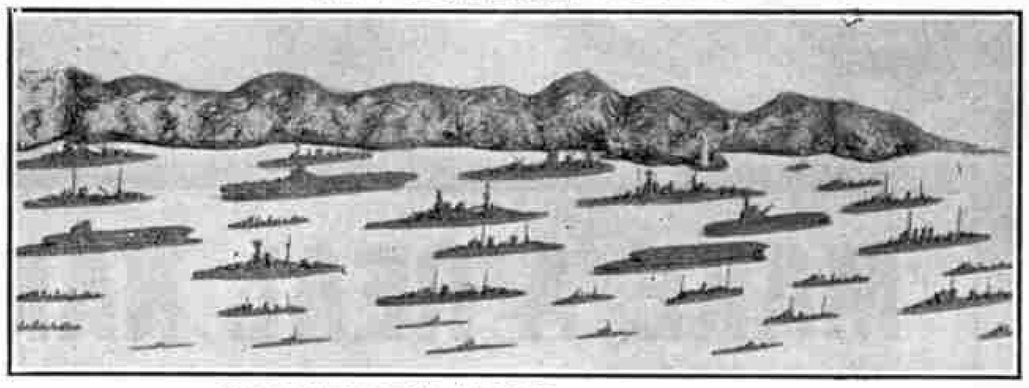

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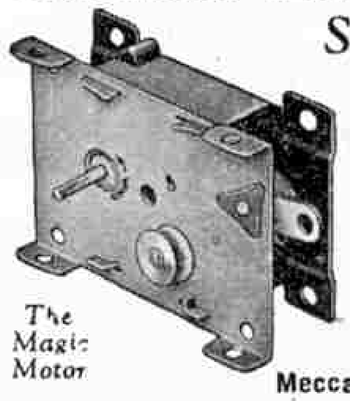

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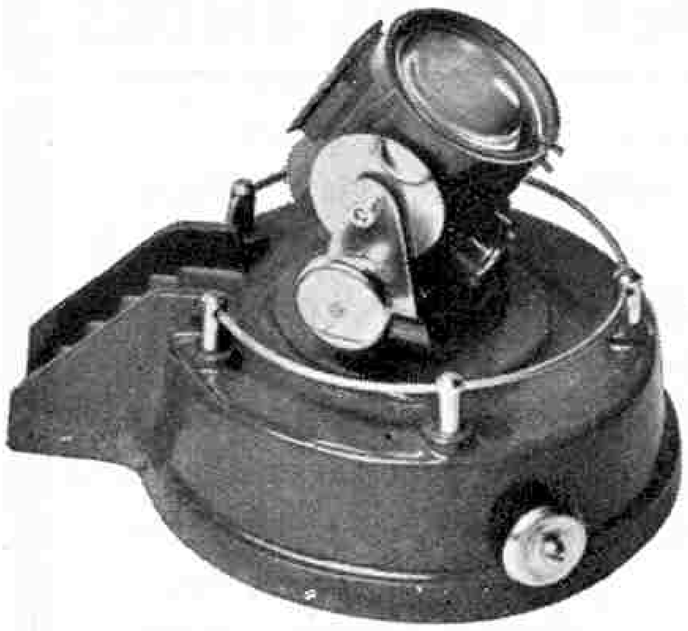

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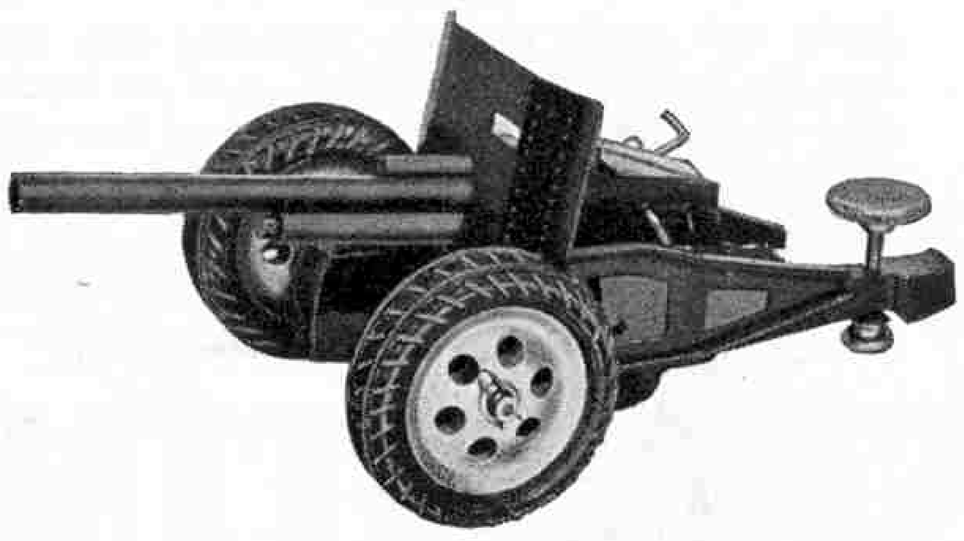

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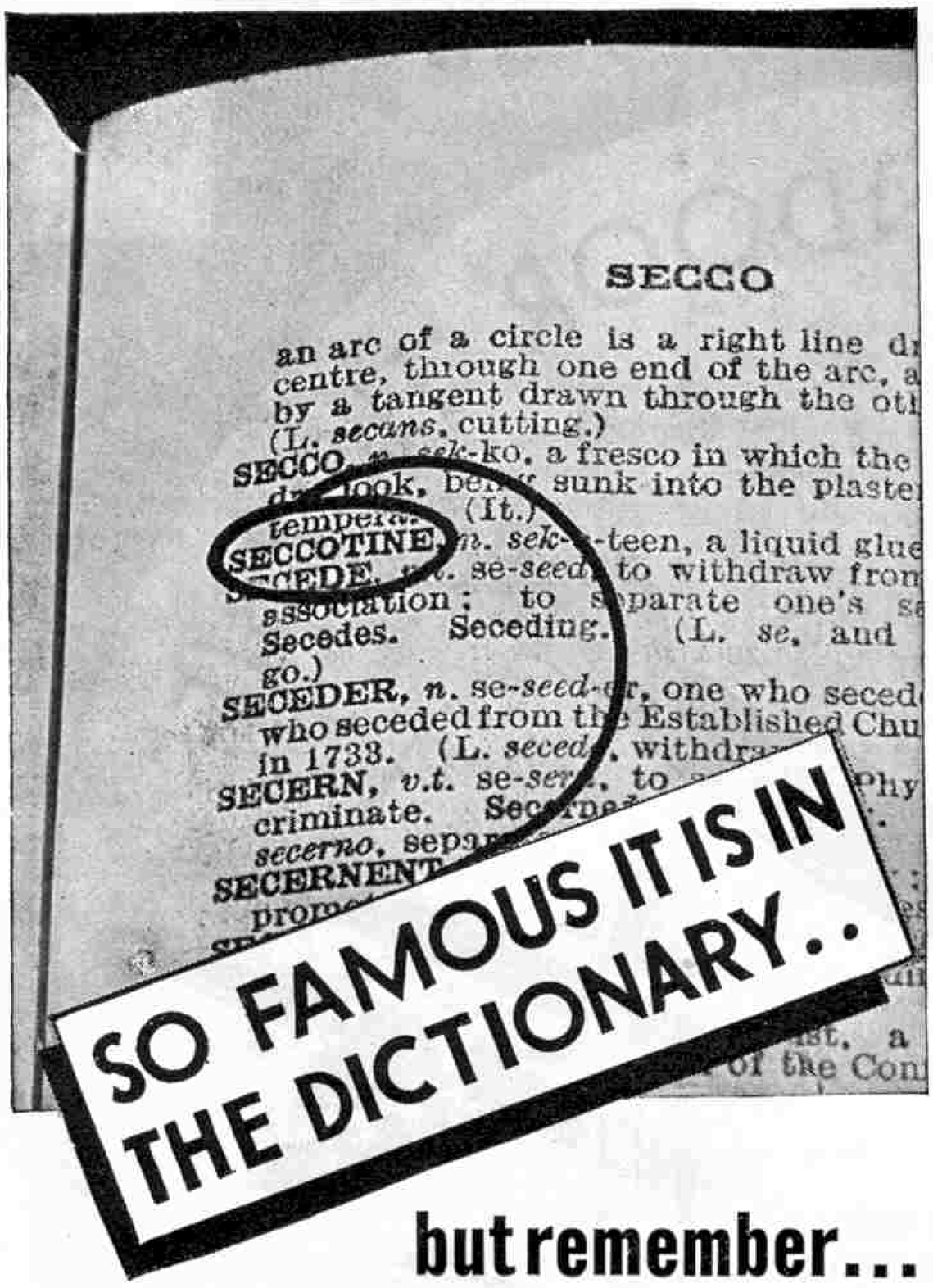
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association; to separate one's se
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go.)
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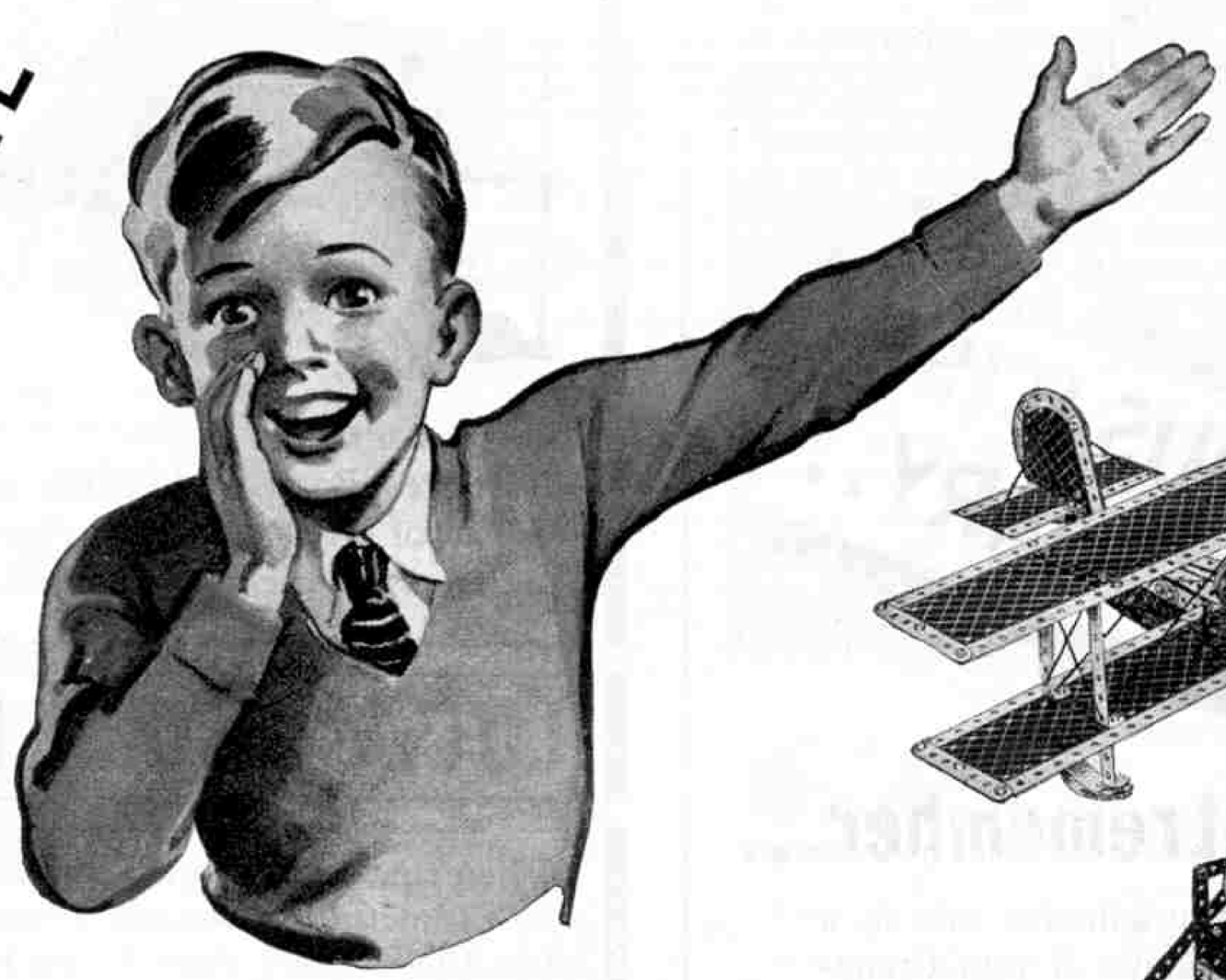

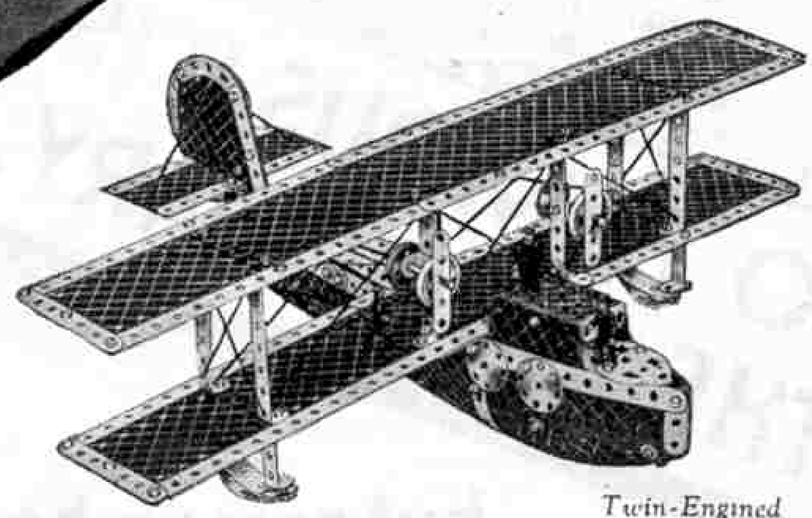

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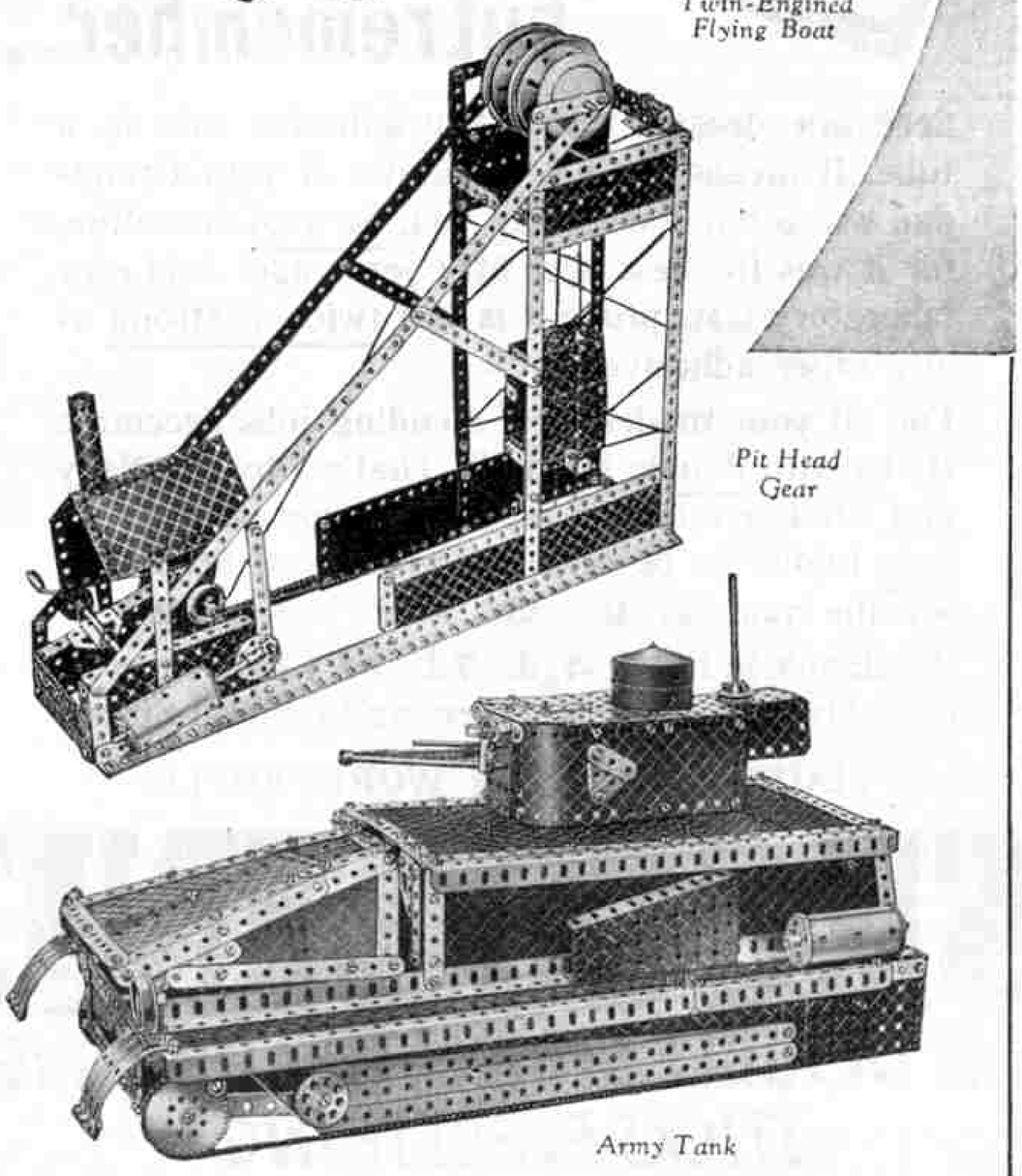

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(Continued from page 470)

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EDITORIAL AND ADVERTISING OFFICE:—
LIVERPOOL 13, ENGLAND
Telegrams: "Meccano, Liverpool."

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To Contributors. The Editor will consider articles and photographs of general interest and payment will be made for those published. Whilst every care will be taken of articles, etc., submitted, the Editor cannot accept responsibility for any loss or damage. A stamped addressed envelope of the requisite size should be sent where the contribution is to be returned if unacceptable.

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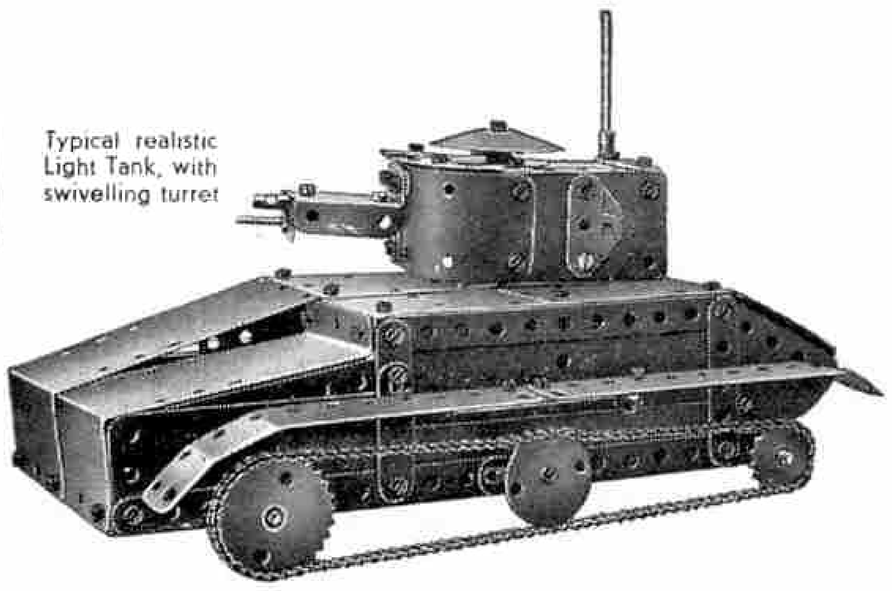

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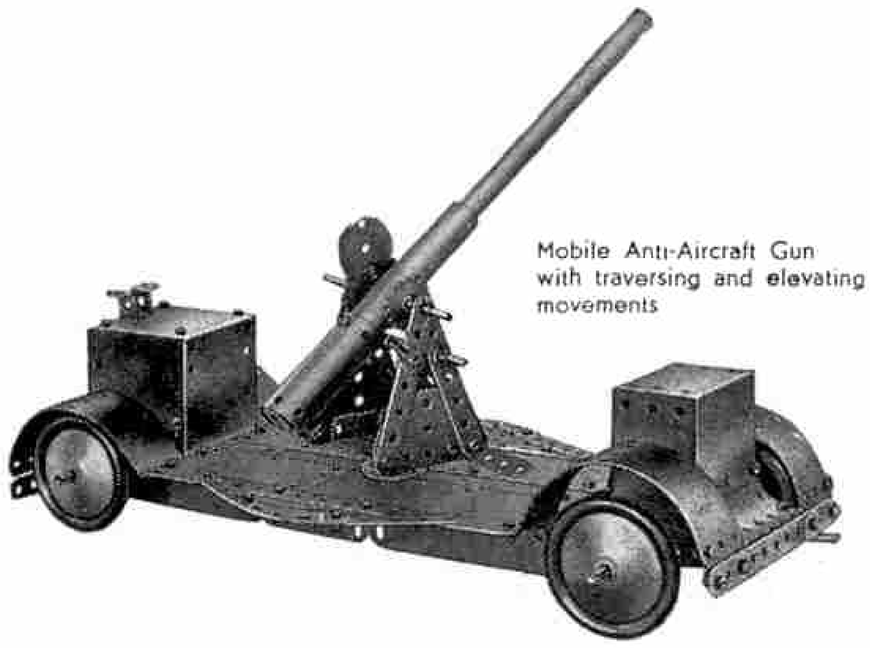

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